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INTRA-THORACIC SURGERY; BRONCHOTOMY THROUGH THE CHEST-WALL FOR FOREIGN BODIES IMPACTED IN THE BRONCHI.[1]

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The extraction of foreign bodies that have become impacted low down in the air-passages has always been a subject of great surgical interest, since such impactions are necessarily of serious import. This paper is only intended to deal with those cases where the body has become lodged in the bronchi, as those arrested in the larynx or trachea are much more easily reached by surgical measures.

In order to determine the possibility of successfully reaching the bronchus through the chest-wall, the following experiments were instituted upon dogs, since so serious an operation demands thorough experimental work before it is attempted upon the human subject; and as this question may be brought to any of us at a moment's warning, it cannot be too speedily settled.

I approached the subject free from bias as to its possibility, desiring only to prove or disprove its feasibility. The experiments are, of course, too few in number to settle the question, but they are placed on record as additional testimony, and to show the extreme inherent difficulties and dangers which must be met in our attempts to invade the thorax.

We have so successfully advanced both in cranial and abdominal

[1] Read before the American Surgical Association, at the Congress, Washington, September 22–25, 1891.

surgery that we are warranted in reviewing anew all the conclusions of the past in an honest effort to secure substantial and life-giving progress in the surgery of the future.[1]

My experiments thus far tend to prove:

1. That the collapse of the lung on opening the thorax, when a lung has not been crippled by disease, is an exceedingly serious and dangerous element, adding greatly to the previous shock, and threatening at once to overpower the patient.

2. The difficulties of reaching the bronchus, especially upon the left side, are exceedingly great and the risks of hemorrhage enormous.

3. Incision into the bronchus necessarily leads, after closure of the chest wound, to increasing pneumothorax, with its subsequent dangers.

4. The delays in the operation from the collapse of the patient must necessarily be great. Rapid work is impossible when the root of the lung is being dragged backward and forward at least half an inch in the efforts occasioned by air-hunger, and precision is almost impossible.

5. To reach the bronchus is sometimes feasible, but to successfully extract a foreign body from it and secure recovery is as yet highly problematical and will require many advances in technique. The anatomical surroundings are those most essential to life.

EXPERIMENT I.[2] *Death from ether; subsequent tracheotomy and bronchotomy.*—Large white and liver-colored blind setter, weighing seventy-five pounds. On account of his size this dog was selected, with a view of performing tracheotomy and of introducing a foreign body into the right bronchus, which, by reason of the large diameter of the trachea, could readily be done.

Before the dog was thoroughly etherized, however, he suddenly ceased to breathe, and all efforts to resuscitate him by artificial respiration were unavailing. He was accordingly utilized by opening his trachea and introducing a pebble the size of a chestnut. An opening was then made in the chest-wall about midway between the sternum and the spine in the fourth interspace. The trachea was easily found, and the stone

[1] Interest in this subject has recently been reawakened by a case in a neighboring city, where a cork half an inch in diameter became lodged at the bottom of the left primary bronchus. The case is reported by Dr. Rushmore in the New York Medical Journal of July 25, 1891.

Dr. Rushmore, after two unsuccessful attempts to extract the body through the trachea, attempted an operation for reaching the bronchus through the thoracic wall, but he was obliged to suspend his procedures by the collapse of the patient before the chest was actually opened.

[2] These experiments have been made possible by the helpful assistance of Drs. Sailer and Hinkle, and Mr. Nicholson, whose efficient aid and suggestions saved much loss of time. I have also made a number of experiments in pneumonectomy and pneumonotomy in continuation of those made by Dr. Sailer and Messrs. Patek and Bolgiano (Univ. Med. Mag., May, 1891, p. 473), which I shall endeavor soon to publish.

passed down into the bronchus on the left side. Search was made for the stone, but it could not be discovered. The bronchus was opened, the aorta being displaced to reach it, and the pulmonary vein pushed forward. No stone could be found.

The sternum was then removed, as in ordinary post-mortems, but search was still unavailing. The left bronchus lay covered by the pulmonary vein, with the aorta a little behind and to the left. The bronchial arteries and veins were of large size and were wounded at the right bronchus in the search. The vena azygos minor crossed so close to the root of the lung that it would have been wounded during any operation. This bronchus was opened, but it contained no stone. After deliberate search through the substance of the lung, and also in the trachea, the stone was at last found in the larynx, although the dog had been held in a sitting position during its introduction. The same thing happened on another dog while being experimented upon, showing the remarkable power of reverse action in the trachea and bronchi, if such it was.

Favier and Sabatier, in experimenting for the removal of foreign bodies from the air-passages in dogs, also found that the objects were always expelled voluntarily after tracheotomy, even when pushed well down into the bronchus and buried with the forceps. They were rejected whether the dog was lying down or upright.

EXPERIMENT II. *Pebble in bronchus; bronchotomy; death; stone found in larynx.*—White cur dog, male. Etherized, shaved, and antiseptically cleansed. Incision was made far back toward the spine in an endeavor to reach the bronchus from behind at the root of the lung. Division of the skin and pectoral muscles gave but little hemorrhage. The incision was carried back into the erector spinæ group, from which free hemorrhage occurred, requiring the use of hemostatic forceps, ligatures, etc. The periosteum of the fourth rib was split longitudinally, and the bone enucleated with a blunt knife and curved hook. The fifth rib was treated in the same manner, and an inch and one-half removed from each with bone-forceps. When the pleural cavity was reached the lung immediately collapsed. Stripping the ribs from the periosteum permitted later opening of the chest cavity.

Before the pleura was opened tracheotomy was performed, and a stone carried well down into the bronchus with a pair of forceps before it was dropped. Search was then instituted, but from the time the lung collapsed the dog was in an extremely bad condition, and died before the bronchus could be opened, although the stone could be easily felt in the right tube. Artificial respiration was of no avail.

After death the bronchus was opened, and although the stone had been carried well down into place, and had been felt in that position, yet the result was the same as reported in the previous case, the stone being ultimately found in the larynx. By what means it had worked its way there could not be ascertained, as the dog was upon a level table and was not inverted.

The difficulties in securing and maintaining perfect antisepsis in dogs are very great. Their distaste to dressings of all kinds is so persistent that the only method of enforcing continuous cleanly applications seems to be by an enveloping outside bandage of gypsum.

EXPERIMENT III. *Bronchotomy through the thoracic walls; death in two days.*—Large, white, male bull-dog, strong and vigorous. Etherized, shaved, and made antiseptic. A large incision was made on the right side, commencing two inches from the spine, in order to avoid the erector spinæ group and to have less hemorrhage. One rib was resected subperiosteally, as in Experiment II. As soon as the pleural cavity was opened the lung collapsed, and the dog became deeply cyanosed. Respiration was shallow, and soon ceased—the heart's action, however, continuing. The wound was closed with a sponge and artificial respiration instituted. After a few minutes the color returned in his tongue, and he was placed upon his back. This process had to be repeated every few minutes during the entire operation. As soon as he was turned upon his left side the weight of the lung and the air-pressure were so great that he immediately ceased to breathe. As the operation could not be proceeded with when he was turned with his right side uppermost, the opening was closed, artificial respiration performed, and he resumed breathing. When on his back respiration could be maintained but two minutes, and it was not deemed safe to do tracheotomy or actually to introduce the foreign body. The upper lobe of the lung was, therefore, turned forward, the bronchus cleared from the surrounding vessels and incised for one-half inch. Very free hemorrhage occurred from wound of the pulmonary vein. This was controlled by hæmostatic forceps, and afterward by chromicized catgut ligatures above and below the wound. The opening in the bronchus was then stitched with chromicized catgut, the gut being threaded upon a small, sharply curved needle. Three interrupted sutures were thus inserted and tied. The chest cavity was cleared of blood. The incision in the chest was then thoroughly sponged and rendered as clean as possible. The deep muscles were drawn together by deep sutures and superficial stitches added.

The dog rallied well, and on the following day ate and drank. Two days later, however, he died. Cause unknown, as through an error I was not notified until after he had been buried, consequently the post-mortem was lost.

EXPERIMENT IV. *Thoracotomy; excision of ribs; bronchotomy; puncture of pulmonary vein.*—Liver and white colored male dog; weight, forty pounds. Etherized, shaved, etc. Incision on the left side in the mid-lateral region between the third and fourth ribs. Four inches of the fourth rib resected periosteally without opening the chest. The pleura was then incised and the upper lobe drawn out. As the dyspnœa in the former case was greatly relieved when the wound in the chest was closed or rendered smaller, an attempt was made to prevent the great inrush of air by drawing out the lobe of the lung and passing it through a slit in a sheet of rubber-dam, thus making an impervious veil and assisting in the relief of air-pressure. The dam was pushed back until the bronchus of this lobe was exposed outside of the slit. The bronchus was bare of pulmonary vessels, and was quickly and easily incised without injury to them. The amount of collapse was less than in the former case, possibly because the left side was being operated upon, and the weight of the heart did not press so heavily upon the left lung, as the heart was in the reverse position. The dog suffered but little from air-hunger. One stitch was easily placed with a curved staphylorrhaphy

needle, and matters looked favorable for a speedy and safe completion of the operation, as the dog was doing well. In placing the second stitch, however, a sudden movement of the root of the lung caused the point of the needle to enter the pulmonary vein, and a gush of blood ensued. This was conducted from the chest by the rubber-dam trough, and the punctured vessel was seized with a hæmostatic forceps and thoroughly tied by passing a catgut ligature beneath the vein with a blunt-pointed aneurism needle. The vein was tied above and below the wound. The placing of the second suture was followed with like result, the lung being dragged out of the hands of the operator during the strong inspiratory movement. More hemorrhage ensued, but was controlled in the same way. Other ligatures were placed, but the blood ran into the opening of the bronchus, and the dog was finally killed, since there was no prospect of his more than rallying from the operation. After death it was found that one stitch had been nicely placed in the bronchus, and that the pulmonary vein had been torn by the point of the needle, but had been secured by ligature. The bronchus was not thoroughly cleared from the surrounding structures before incision was made, hence the accident.

EXPERIMENT V. *Thoracotomy; death from ether and collapse of lung.*—Incision on the left side opposite the seventh rib, which was resected periosteally. Anterior part of the bronchus of the left upper lobe exposed and cleared, when the dog suddenly collapsed from heart failure, or perhaps from pressure upon the pericardium, with probable rupture of the septum between the lungs. Artificial respiration proved of no avail.

In this case the posterior part of the bronchus of the middle lobe was easily reached and seen. The aorta lay to the left, with the pneumogastric a little posteriorly, so that it would have been easy to have reached the bronchus. The upper bronchus anteriorly was also easily exposed. Incision at the seventh rib is a little too low. The bronchus had been thoroughly isolated when the collapse occurred, and could have been easily incised. Rubber-dam was used as a valve.

EXPERIMENT VI. *Thoracotomy; bronchotomy; suturing of wound; death fifteen minutes after completion of operation.*—Large black and white mongrel; weight, thirty pounds. Incision on right side. Fifth rib excised subperiosteally, but a serious hemorrhage occurred from the intercostal artery, which was finally controlled by ligature. The bronchus of the first lobe proved to be inaccessible, both anteriorly and posteriorly, being deeply concealed and covered with the pulmonary vessels. The bronchus of the second lobe was reached anteriorly and incised for one-third of an inch.

Three chromicized catgut sutures were introduced into the side of the bronchus wound and tied, a staphylorrhaphy needle being employed. The difficulties and delays in the operation were found to be the same as in the previous cases from the fact that resuscitation had to be performed many times after apparent death. The dog, however, was kept alive and the wound closed. He did not rally, and died in fifteen minutes.

The post-mortem revealed no hemorrhage; bronchus cleanly cut, without injury to surrounding structures, and sutures well placed.

EXPERIMENT VII. *Excision of ribs; bronchotomy; large pulmonary veins; death.*—Skye terrier, male. Etherized. Incision laterally from

the point of the scapula. Fourth rib resected. A three-inch incision on the left side. Immediate collapse of lung on admission of air. Shock so great on collapse of lung that but little ether was subsequently required. The bronchus of the upper lobe found concealed by enormous pulmonary arteries and two huge pulmonary veins which lay in front, completely covering it. These were carefully isolated, but the great depth of the bronchus rendered it entirely impossible to incise it, as the vessels could not be held out of the way. The bronchus of the middle lobe was exposed posteriorly. The aorta and pneumogastric lay absolutely upon it, so that operation seemed hopeless, but it was at last incised without injury to the vessels. One stitch was safely inserted with a staphylorrhaphy needle, but the bronchus being very brittle the second stitch tore out, and the dog, having been resuscitated eight times during the operation, finally died.

The relation of the bronchus to the pulmonary vessels was found entirely different from the previous cases, being much larger and the bronchus deeper. The root of the lung, also, was situated low down in the thorax, so that the incision was too high. The fifth rib would have been better.

EXPERIMENT VIII. *Simple incision of bronchus without stitching; death from increasing pressure of pneumothorax.*—Black and white mongrel, male; weight, twelve pounds. Etherized, shaved, and rendered antiseptic. Incision on the right side. Excision of the fifth rib one inch and a half. The bronchus leading to the right upper lobe was exposed. The bronchial and pulmonary veins were pushed aside. Very large azygos vein. The bronchus was incised for one-third of an inch without wounding any other structure. No hemorrhage took place. The pleural cavity was cleaned of a few drops of blood issuing from the divided intercostals. The intercostal muscles were stitched with continuous suture of catgut; pectoral muscles ditto, securely closing the chest. The skin was also closed in the same manner. The line of suture of the muscles showed a constant tendency to bulge, and the air soon burst through it at each inspiration. The dog breathed with comparative ease, and was rallying, while the wound was partially closed. So soon, however, as complete closure was accomplished, the dyspnœa became more marked, the tissues being pushed out more and more at each inspiration. The pneumothorax steadily increased, pushing the heart to the left and with it the septum, thus interfering with the left lung. Death speedily ensued.

The opening in the bronchus evidently permitted the air at each inspiration to escape through the incision into the pleural cavity, but from the cylindrical shape of the tube return was prevented by closure of the slit. The action was that of a force-pump driving more air into the pleural cavity, which is probably the explanation of the increasing pneumothorax.

An examination of the parts after death showed that the incision had been cleanly made in the bronchus, and that no injury had been done to any vessel or nerve-structure in the line of the wound. There was no hemorrhage, and death was apparently from the cause mentioned.

This experiment was made to observe the effect of a wound left open in the bronchus without stitching. The increasing pneumothorax seemed to be caused by the valve action of the bronchial slit.

It has been demonstrated that the air of the bronchi is septic, and

that it only becomes aseptic by the time that it reaches the bronchioles and air-vessels.

My experiments show that upon the left side the bronchus of dogs is enveloped by the pulmonary veins and arteries and bronchial vessels, and although the aorta and pneumogastric can be speedily recognized, yet the cardiac and pleural branches of the pneumogastric run so closely to the root of the lung that the dangers upon the living animal are simply enormous, and in a human patient I cannot imagine a more appalling array of difficulties than would meet the surgeon in such an attempt, with these enormous vessels on either side and the heart in close proximity. Combined with the labored movement of the lung, the operation is one beset with extreme difficulties.

On the right side, while the array of obstacles is not quite so serious, yet the danger is increased by the close proximity of the azygos vein, and in dogs the pressure of air upon the septum, together with gravity, pushes the heart so far to the left, and interferes so greatly with the action of the only lung which is capable of rendering service at this time, that it occasions greatly increased risks from apnœa.

Dr. Rushmore states that in the cadaver, however, the operation is not difficult, but expresses doubt as to the condition of a living subject. I can say that in a dog the aspects of the parts during life and after death are as absolutely different as they can possibly be. A bronchus which after death is easily exposed, and which is reached with the greatest ease, I have seen five minutes previously absolutely enclosed with huge pulsating vessels of twice the size, any one of which if punctured would seriously complicate if not render the operation absolutely fatal. The alteration of the parts in life and in death can only be appreciated when seen.

I attempted a posterior entrance in a number of experiments, but found a much more serious delay from hemorrhage of the great veins which supply the erector spinæ group of muscles.

The plan of Nesiloff consists in opening the thoracic cavity in the posterior mediastinum from behind by the resection of the ribs without touching the pleuræ. As the relation of the parts is different in dogs, this cannot be so readily accomplished in experiments.

The patient should be laid upon his abdomen and a vertical incision made parallel to the vertebræ, three inches to the left; two horizontal incisions are carried toward the vertebræ from either extremity of the first, and the flap raised. A sub-periosteal incision of the third, fourth, fifth, and sixth ribs is then performed either by removing them or by bending them by fracture, so as to replace them after the operation. The pleura is then pushed forward and the bronchus searched for.

This operation has been employed to reach the œsophagus, and it is possible that it may yet be used in searching for the bronchus.[1]

The operation which was attempted by Dr. Rushmore, but which was not completed, was the making of a flap three inches long and three inches wide, with its detached edge along the left clavicle. He had cut through and pushed back the pectoral muscles, and was about making the section of the ribs with a saw, when he was compelled to desist his efforts in order to revive the patient.

The difficulty in extraction through the trachea in this case was that the round body, half an inch in diameter, accurately fitted the cylindrical bronchus, and gave no opportunity for the forceps to grasp it unless the bronchus could be first dilated sufficiently to allow the jaws to pass between the walls of the tube and the cork. He employed various devices for securing the object after tracheotomy with division of the second, third, and fourth rings. Air-pump suction worked perfectly well in experimenting upon rubber tubing and cork, yet it could not dislodge the object when held by the swollen mucous membrane of the bronchus. Instruments with concealed hooks he discarded as useless on account of the impossibility of accurately distinguishing between the cork and the mucous membrane. This I have found an exceedingly difficult thing even with rougher bodies than cork, as the cartilaginous rings give a firm sensation to the probe, greatly resembling a foreign body. Piano-wire loops were also tested by experiment on tubing, but the loop would not pass beyond the body. Adhesive substances were found to be useless on a moist surface. With Tiemann's œsophageal forceps he was able to distend the rubber tubing and grasp the cork. These seemed the most hopeful methods of relief offered, and they were used at the first operation. At the second operation he thought his instrument touched the cork. This, however, was only conjecture.

At the first operation the patient was etherized forty minutes, when, as the object was not found, he was allowed to recover. His temperature varied subsequently from 100° to 103°.

The second operation was attempted five days later. The patient labored under increasing difficulty of respiration. There was dulness over the left thorax, and he was evidently sinking. A corkscrew, concealed in a hollow tube, 30 French calibre, twelve inches long, slit from end to end for the purpose of respiration, was employed. This apparatus consisted of three portions, an outer envelope, an inner tube with two concealed spikes, and within this a long-handled corkscrew, which could be easily rotated. He was able to reach the cork and was satisfied that the spikes were not fixed in the wall of the bronchus by rotating

[1] In the Journal of the American Medical Association, June 25, 1891, it is stated that Figuiera was experimenting upon this subject by the posterior incision, but I have seen nothing published by him.

the whole instrument on its long axis. The screw having been presumably driven into the cork, traction was made. The coil, as was proven later, pulled from the cork. The patient coughed up a moderate amount of bloody mucus, and, breathing with markedly increased difficulty, became deeply cyanosed, which cyanosis continued until the end of the operation.

The difficulty of respiration was increased, and it was believed that the cork had passed over to the right bronchus. After ten or fifteen minutes' further search the anterior operation, as described, was attemped but abandoned. Death occurred five days later, the condition never again warranting operative procedures.

At the post-mortem the cork was found at the bifurcation of the left bronchus. The lower end of the cork was broken off, probably before it was swallowed. The mucous lining was sloughing and congested. Pus oozed from the small bronchi. The lung was hepatized. The right lung was slightly congested and œdematous. Two punctures were found upon the upper surface of the cork, and a small piece was missing.

When a foreign body becomes impacted in the bronchus, the gravity of the injury becomes more and more serious. According to the statistics of Weist and others, a large percentage of these are fatal ultimately either from pneumonia, gangrene, abscess, or other complications.

On a careful physical examination to determine the site of the impaction the quality of the sounds elicited on percussion will vary from slight dulness to flatness according to the amount of blockade, and also with the nature of the body itself. The primary percussion note will not be altered except where there is complete obstruction. Later, if pleurisy or pneumonia supervene, of course the ordinary physical signs will be present. If there is entire obstruction, or if complete collapse occurs, there will be but little, if any, movement of the ribs.[1]

A metallic substance will, of course, give forth a more whistling sound, and peculiar-shaped bodies may occasion strange notes. The respiratory murmur may be altered in tone—may be extinguished or altogether lost, while upon the opposite side respiration will usually be puerile.

The primary symptoms of bronchial impaction are usually dyspnœa, livid face, spasmodic cough, pain in the chest, and less interference with the voice than in laryngeal impaction. Thoracic pain is usually present and very constant. Expiration is ordinarily more difficult than inspiration.

[1] Stengel (Univ. Med. Mag., August, 1891, p. 729; Brit. Med. Journ., April 25, 1891) says that we can determine definitely by auscultation which bronchus is filled. If the air does not pass in, then it is entirely occluded; if the sounds are sibilant on inspiration, the obstruction is incomplete and the opposite side will be normal. The sound will, of course, vary as the object is tubular or solid. In partial obstruction of the bronchus a portion of the lung may be resonant.

The prognosis of these cases is much more serious than in tracheal and laryngeal obstruction, and the chances of securing the body either by operation or by voluntary expulsion are greatly diminished.

It must be remembered that foreign bodies sometimes shift from one bronchus to the other. The right bronchus, being almost in line with the trachea and occupying as it does nearly three-fifths of the area of the tube (from the fact that the spine of division lies to the left of the median line), is most likely to receive the foreign body. Cheadle found that in thirty cases, sixteen were on the left side. Kocher gives Sander's tables of twenty-one deaths without operative interference or expulsion, of which ten were in the right bronchus, none in the left. In thirty-four cases operated upon, thirteen were on the right, five on the left.

Beleg gives thirty cases, in which nineteen were in the left bronchus.

The right bronchus is three-quarters the size of the trachea; the left, one-half. The right is about one inch in length; the left, two inches.

Voluntary Expulsion.—This is so common an occurrence that this end should not be despaired of even when the body is within the bronchus. Of course, much will depend somewhat upon the character of the body. Seeds of all kinds will naturally swell under the action of heat and moisture, and may, at first, occasion increasing obstruction, but as softening occurs, expulsion may be accomplished by a voluntary effort of the patient. Hence the policy of non-interference in seed impaction is usually the wise course. Expulsion usually occurs in the first few hours, but it may be delayed for weeks; one case is on record where a bone remained for sixty years. Secondary expulsion may occur after ulceration and abscess, and, although these cases even end in recovery, yet such degeneration of the lung frequently results in death. A body occasionally becomes encysted; night-sweats and emaciation often follow, and the tubercular process may be engrafted upon the inflammatory lesion.

Inversion.—Many authors advise against inversion of the body, but in my judgment this procedure is advisable in bronchial impaction, especially when the substance is metallic, and particularly after tracheotomy, when the risk of its lodgement in the larynx has been greatly diminished. Campbell reports a death from hemorrhage during inversion, but this is exceptional.

Statistics of foreign bodies impacted in the bronchi show a slight increased percentage in favor of non-interference. When, however, the obstruction can be located, a low tracheotomy is justifiable with cautious attempts at extraction. These should not be prolonged, nor should imprudent force be used.

Considerable difference of opinion exists upon the propriety of operation in bronchial impaction. Kocher says that operation for the removal of foreign bodies is but an experiment. Weist proves almost conclusively

that nearly 90 per cent. will recover without operation. Westmoreland favors operation when the foreign body is in the upper air-passage, but when in the bronchi it is not advisable. When a foreign body becomes impacted in the bronchus, extraction is an impossibility in 78 per cent. of cases even after tracheotomy.

Weist considers that the mortality is increased by tracheotomy in bronchial impaction, since the risks of the operation are added to the primary danger together with the perils arising from the temptation in the hands of a rash surgeon to prolong operative efforts. Ulceration and perforation may result. Small, hard bodies are the ones most liable to drop into the bronchus, but they seldom pass beyond the binary bifurcation.

Gross advises that not more than three attempts of one minute each should be employed with forceps to remove a foreign body.

The danger of the operation is largely increased by injurious instrumentation. Thirty per cent. of the deaths following operation are from pneumonia, while this disease causes death only in 18 per cent. of non-operative cases. Still, as Rushmore wisely remarks, when the deaths from broncho-pneumonia are added, the results are practically similar. The failure to extract a foreign body even after operation in 78 per cent. of cases is certainly an unfavorable showing, but, from my experiments upon dogs, I certainly am not inclined to believe that the chances of recovery would be increased by approaching the bronchus through the chest-wall.

For the purpose of extraction, forceps of various curves are required. Gross's, Cohen's, Mackenzie's, or Cusco's lever-bladed ones are the best. D'Etiolle's spoon, or a bent wire, or a blunt hook, may sometimes be required, varying with the nature of the body to be extracted.

The forceps, though slender, should be exceedingly strong and should have simple serrated edges, so as not to wound the mucous lining of the tube. After the body has been fixed by inflammatory action, however, extraction is often impossible with these forceps. In the case of round bodies, as peas, beans, and peculiar-shaped substances, forceps with sharp teeth are permissible in order to prevent slipping. The manipulations must be performed with extreme caution, and the withdrawal must be slow. Instruments acting upon the plan of a corkscrew are occasionally employed, but a soft substance capable of being penetrated by such a device would render the diagnosis of its having been grasped an obscure one.

Suction by a Bigelow litholapaxy pump through a tube with an open end would be useful for the removal of small articles. Such a tube could be made much larger than the ordinary urethral one, or rubber tubing can be employed. I am experimenting with a rubber tube that

can be expanded so as to occupy the entire calibre of the bronchus, and thus give strong suction-power.

After tracheotomy the wound should be kept open by blunt hooks or by stitches: never by a canula, which would block the exit and prevent the voluntary expulsion which is so common even after failure with instruments. The dressing should be simply loose gauze, to exclude the dust without interfering with the exit. The air should be heated after the operation to 80° or 85°, as I am satisfied from experience that all tracheotomies do better in a high temperature.

When the opening in the trachea gives entire relief from dyspnœa, it is very improbable that any object is fastened in the bronchus. Tracheal mirrors with electrical illumination, as well as laryngeal ones, should be employed in the diagnosis after tracheotomy. The greater the extent and duration of the dyspnœa the greater will be the danger from pneumonia after tracheotomy.

The work of Avonssohn, Gross, Durham (Holmes' *Surgery*), Weist, and others have made possible many successful results.[1] It is certainly impossible for any surgeon to diagnosticate beforehand whether his individual case is one of those in which the obstruction will be loosened and coughed up, or whether it will remain, producing gangrene, pneumonia, or subsequent abscess, consequently each case should be most thoroughly considered.

Bronchus originally meant the windpipe, while the two primary divisions were named bronchia, hence the term bronchotomy was used to designate any opening in the air-passages of either larynx, trachea, or bronchus; and Gross and other writers, even as late as Weist, still use the term to designate the high operation. It should be confined to operation upon the bronchus, as laryngotomy and tracheotomy properly designate these higher operations.

Weist (*Trans. Amer. Surg. Assoc.*, vol. i.) gives an accurate and careful analysis of 1000 cases of foreign bodies in the larynx, trachea, and bronchus, as will be remembered by all the members of this Association. In it he shows conclusively that the simple presence of a foreign body is not an absolute indication for operation, as had been previously held by most surgical teachers. While operation is the rule, yet there are modifying circumstances. His conclusions were that 76 per cent. of non-operative cases recovered, and 72 per cent. of those operated upon, but, of course, the latter were the worst class, as the former included many in which early expulsion took place. Weist does not advise opening simply because a foreign body is present; there must be some other indications. He advises non-interference when a foreign body

[1] Bourdillat gives a large collection of cases (Poulson, On Foreign Bodies, p. 33). Also Maurice Perrin gives statistics.

remains quiet and the symptoms are not serious, but favors operation when the body is movable and when there are frequent attacks of suffocation.

Smith gives 1600 cases, with 70 per cent. of recoveries of non-operative cases and 76 per cent. of operative ones, the proportion being one death to every three and a half cases not operated upon, and one death to every four of those operated upon.

Durham gives 50 per cent. of recoveries in non-operative cases and 77 per cent. of operative ones; also, he gives 74 per cent. of tracheotomy recoveries. Guyon and Durham, in 1674 cases, give 70 per cent. of recoveries in non-operative cases and 75 per cent. in operative ones.

Medico-legal cases arise in connection with impacted objects in the bronchi, as death is sometimes sudden. Only a few days since a mother was arrested for killing her child. Post-mortem revealed the fact that during the operation of spanking the child had swallowed a button, which had caused almost immediate death.

Conclusions.

1. The bronchus in dogs can be reached either anteriorly or posteriorly through the chest-walls, but the anatomical position is in such close proximity to large and important structures that safe incision is a matter of extreme difficulty and danger.

2. Bronchotomy through the walls of the thorax is an operation attended with great shock from collapse of the lungs, and until technique is further advanced is liable to result in immediate death.

3. Collapse of the lung is more serious in a healthy organ than in one previously crippled by disease.

4. The serious inherent difficulties are shock, suffocation from lung collapse, enormous risks of hemorrhage from pulmonary vessels, injury of or interference with the pneumogastric, great and fatal delays owing to the exaggerated movement of the root of the lung caused by the excessive dyspnœa.

5. Closure of the bronchial slit is slow and dangerous. To leave it open causes increasing pneumothorax by its valve action, and also permits the entrance of septic air into the pleural cavity.

6. Although a foreign body can be reached by this route, yet removal is hazardous. To secure a subsequent complete cure seems in the present state of knowledge very problematical.

7. When the presence of a foreign body in the bronchus is definitely determined, and primary voluntary expulsion has not been accomplished, there is great danger in permitting it to remain, even though it may but partially obstruct the tube. The risks both of immediate and of subsequent inflammation are serious.

8. Low tracheotomy is, then, advisable when the presence of a foreign body is certain; it adds but little to the risks and affords easier escape for the object even when extraction is not feasible.

9. *Subsequent dangers arise from severe and prolonged instrumentation, not from tracheotomy.*

10. Voluntary expulsion is more probable after than before tracheotomy.

11. Tracheotomy is permissible even after an object has been long in position, unless serious lung changes have resulted.

12. The question of tracheotomy will depend largely upon the form, size, and character of the foreign body.

13. The term bronchotomy should be limited to an opening of the bronchus, and should not be employed to designate higher operations.

14. The risks from thoracotomy and bronchotomy following unsuccessful tracheotomy are much greater than the dangers incurred by permitting the foreign body to remain.

1818 Chestnut Street.

THE KINDRED OF CHOREA.

By Octavius Sturges, M.D., F.R.C.P.,
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The help which statistics can bring to the pathology of chorea is of doubtful value. As regards its rheumatic relations in particular, figures are appealed to year by year to support conflicting views, and while it can hardly be said that opinion is less sharply divided to-day than a generation ago, it has certainly lost in vigor of expression. Thus the statements of Sir Dyce Duckworth,[1] that "chorea is a manifestation of the rheumatic habit," and that "rheumatism holds the first place in its etiology," though not wanting in boldness, are less daring and less direct than the simple words of Henri Roger thirty years back, declaring rheumatism and chorea to be one and the same affection under two forms. On the other hand, writers of repute, especially in Germany, deny altogether the kindred of the two disorders. Between these extremes there is much variety. Osler reckons the association of rheumatism with chorea, near and remote, to be 15 per cent., the Collective Investigation Committee makes it 26 per cent., Romberg and Steiner almost nothing per cent. The nearest approach to agreement may, perhaps, be stated thus: Cases of chorea occurring in immediate connection with rheumatism are very few, certainly under 10 per cent.

[1] International Clinic, April, 1891.

Cases of connection, either near or remote, are very differently stated by different observers, but according to most they fall below 30 per cent.

It is easy to account for this discrepancy. Rheumatism in children is apt to be so evanescent that we cannot assert positively of any child whatever that it has not been the subject of it. It can be invoked at pleasure. Of the many pains attributed to children, no one can separate for certain the rheumatic from the non-rheumatic. Apart from the parent's report, which is worthless in such a matter, even our immediate judgment as to the rheumatic nature of joint pain in young children is often open to question. There are growing pains and there is the fever of growth.[1] In the case of those choreic children who best resist an imputation of this sort, which can never be wholly disproved, there still remains the family to fall back upon, including, it is probable, some old persons who so name the pains of senility. But even so, the resources of the rheumatic advocate are not exhausted. Rheumatism—that is, in Sir Dyce Duckworth's phrase, "overt" rheumatism—may be before or after. The child has its life to live and its morbid manifestations to develop, rheumatic and other.[2]

Better than the expenditure of time and ingenuity in exercises like these is a frank admission that the precise admixture of chorea and rheumatism in the same subject is not ascertainable. Attention may then be directed to some unquestioned facts, clinical and anatomical, which not only render the kindred of these two affections a matter of certainty, but may also suggest something of the nature and method of the association.

The points I refer to are two, and they concern respectively (1) the cardinal anatomical feature of chorea, namely, endocarditis, and (2) the well-ascertained clinical fact that in the case of children exceptionally young—at that age, I mean, when both chorea and articular rheumatism are rare—there is a frequent and an intimate connection between the two affections which disappears in later life.

Of the first of these points, the morbid anatomy of chorea, it behooves us to speak with caution, inasmuch as death is its very rare event, so rare, indeed, that there are many with large experience of the disorder who have never seen it fatal. Partly on that account, and partly because post-mortem records of chorea are concerned mainly with the nervous system, the most striking feature in these fatal examples—I do not say the only striking feature—namely, the frequent presence of recent endocarditis (meaning by that term a fringe of soft, fibrinous beads at the edge of the mitral valve), has been too little regarded.

[1] Bouilly: Journal de Médecine, December, 1879.

[2] According to the Collective Investigation Committee's Report on Rheumatism (Brit. Med. Journ., September 29, 1888), this unknown quantity—the rheumatic yet to be—would not amount to much. In 655 rheumatic people 13 only, or about 2 per cent., had had chorea.

Some years ago I collected from various sources 80 cases of death in connection with chorea,[1] or at least with symptoms so accounted. Only half that number are reported with sufficient detail to be of much value. Of the 40 that may be so described there are not more than 6 (one of them an elderly woman, who probably ought not to count) who are free from "vegetations" on the mitral valve. Yet, as will be seen presently, only a small proportion of the 40 have a rheumatic history. Taking the 25 cases most completely reported, 22 by Dr. Dickinson and 3 by Dr. Peacock,[2] it appears that of the 22 as many as 17 have vegetations and 5 have none; of the 3 (all dying of the exhaustion of chorea, and on that account the most apt examples) 2 have vegetations and only 1 has none. But this one, as we shall see, is among the most striking examples of death by chorea anywhere recorded.

Notwithstanding this very common presence of endocarditis (using the term here and elsewhere in the sense just given), only a few of these fatal cases, I say, have a rheumatic history. Out of 32, 7 only could be so accounted. Eighteen of these 32 may be said to have died not only *with* but *of* chorea. Only 3 of them, so far as is known, are of rheumatic origin. In other words the fatal cases, though mostly exhibiting endocarditis post-mortem, are not rheumatic, so far as their history shows, in much larger proportion than other subjects of the disease.

It may be observed, by the way, of the majority of these fatal cases, that they are not children, but growing-up boys and girls. In 35 examples of patients dying of or with chorea—an obvious distinction—20 are over thirteen and only 15 under that age. It would be easy to show, further, that while fatal chorea happens mostly at the emotional age, and to the emotional sex, its exciting cause is commonly some obvious mental disturbance,[3] a fact which, taken in conjunction with familiar experience of nervous children frightened into chorea, makes

[1] Chorea, p. 72.

[2] See Med. Chir. Trans., vol. lix. p. 27, and St. Thomas's Hospital Reports, vol. viii. p. 27.

[3] See Chorea, p. 79, etc. A case of fatal chorea occurring lately in the practice of my friend and colleague, Dr. Donkin (and which I have his permission to mention), is the latest of many illustrations of this that have come under my notice. It illustrates also certain points in connection with non-rheumatic endocarditis in chorea, presently to be noticed. Thomas D., aged fifteen, has never had rheumatism, nor is there rheumatism in the family. He was much alarmed by seeing a man killed by a tram-car. Three weeks after, twitching movements were noticed. These were much aggravated three days later, when the patient, being already in a highly nervous state, was startled by a cat. Shortly after admission the chorea became very violent. The heart-sounds were normal throughout. A week before death bedsores appeared. Admitted April 24. Died May 23, 1891.

Post-mortem: Heart weighed five and three-quarters ounces; on the edge of the mitral valve a complete ring of coarseish, small, but recent vegetations; endocardium elsewhere normal.—Westminster Hospital, P. M. and Case-book, vol. vi. 292.

amazing the statement of Sir Dyce Duckworth that "rheumatism holds the first place in the etiology of chorea."

If it be considered how much larger is the total number of children suffering from chorea under thirteen than above that age, the fact that fatal cases (extremely rare at whatever age) are most frequent with the elder children, becomes the more significant. Fatal chorea in a young child becomes conspicuous by its rarity. In all my search I can discover but two examples of it—a boy aged eleven and a girl aged twelve—to be presently mentioned more particularly. And it so happens that these children aptly illustrate the fact already noticed, that endocarditis, although so common, is not a constant feature in the morbid anatomy of chorea. One of the children had it, the other had it not.

Now, the position brought to view by the foregoing facts is this: Endocarditis (in the sense just described) is to be found in the hearts of the great majority of patients dying with chorea, whether with or without rheumatic history. Is this condition of the endocardium to be regarded as of itself a proof of the "rheumatic habit," as Sir Dyce Duckworth puts it? If so, then it must follow upon post-mortem evidence, which is amply sufficient, that choreic patients are almost always rheumatic, and this notwithstanding that in the past history of most of them (as I have shown) no "overt" rheumatism appears.

Accepting the premises, all that could be urged against the conclusion, and this with no great force, would have reference to the extreme rarity of fatal chorea and the danger of basing pathology upon the showing of exceptional cases. But there is a word to be said before making the admission in question. It is this: While the frequency of endocarditis in fatal chorea is beyond all possible cavil, a broad distinction is to be drawn between those subjects who exhibit it post-mortem, and only so, and those who both in life and death are veritable examples of rheumatic chorea. In the one case endocarditis is only recognizable after death. It has no living signs, no progressive history of heart failure, and often no known rheumatism; in the other, endocarditis (anatomically similar, but not the same) is one of a series of well-marked cardiac changes, having their origin in rheumatism, and ending sooner or later in death, to which the chorea contributes nothing. In other words, the endocarditis attending chorea is of two forms. In one, the non-rheumatic, it is a post-mortem phenomenon, affecting the mitral valve, but not affecting the heart either clinically or anatomically—a liability of chorea as such; in the other, the rheumatic, it early becomes manifest, produces obvious physical changes, which, from their character and from the history of the patient, no one doubts to be rheumatic, and in its usual course, whether the chorea persist or not, is at last fatal by heart failure.

That the occurrence of endocarditis, both in chorea and rheumatism,

supplies evidence of affinity between the two affections I shall not deny. It is no evidence at all that the subject of the former is personally rheumatic or of "rheumatic habit." It happens in chorea in one way and in rheumatism in another way.

In witness to the fact that the endocarditis of chorea is *sui generis*, that it has no objective signs, and that the manner of dying is precisely the same with it as without it, let me return to the two cases already referred to as among the most striking examples of their kind—one reported by Dr. Peacock, the other by myself—the patient being the late Dr. Fuller's, at St. George's Hospital. Both died of the exhaustion of violent and persistent chorea. Dr. Peacock's patient[1] was a girl of twelve, who had never had rheumatism, scarlatina, or any other serious illness. The attack was attributed, as it so often is in these fatal cases, to a nervous cause, the teasing of a mistress where she served as a nurse to a baby. She died thirty-four days after admission and forty-four from the commencement of the symptoms, exhausted by the constant movements. And in her case the heart and pericardium were found "quite healthy, and there were no vegetations on any of the valves," nor any other abnormal appearance. The St. George's patient, a boy of eleven,[2] showed preciseiy similar symptoms, and died like the other, worn out after two months' residence in the hospital and more than five months' endurance of the most violent chorea of unknown cause. No cardiac symptoms had been discovered in his case any more than with the girl. Post-mortem, however, the inner edge of the mitral showed a line of soft beads easily detached. Here, as in other instances that might be quoted (including Dr. Donkin's, just referred to), the endocarditis makes really no difference or distinction. But for post-mortem inspection its presence in the boy would never have been known. It was without objective sign, and the mode of death was exactly the same with it as without it.

It is not so that rheumatic endocarditis behaves. In those striking yet not common cases where acute rheumatism and chorea occur in close proximity, or alternating the one with the other, valve disease, the product not of the chorea, but of the rheumatism, tends early, as everyone knows, to mitral stenosis and consecutive changes in the heart's size and shape. In such children[3] it is in the intervals of the

[1] Loc. cit. [2] Chorea, p. 174.

[3] In illustration of the class of cases here contemplated, and not for any special interest of its own, let me mention that of Mary E. H., under my care for a while at the Convalescent Branch of the Hospital for Sick Children (December, 1874), eventually dying in the London Hospital of heart disease. This child, aged eleven, had five or six attacks of chorea, the first preceded by rheumatism, but caused immediately by fright. She was admitted to the hospital for chorea, and had then well-marked mitral disease. When convalescent from the chorea, and at the Convalescent Hospital, peri-

rheumatic attacks, a little before or a little after, that chorea is apt to appear; but its advent, unlike the rheumatic visitations, each of which brings new mischief, is of pathological interest rather than practical importance. The heart disease progresses the same, with the chorea or without it, and, as a common rule, death comes eventually through heart failure long after the child has outgrown the nervous disorder. Contrast such a case with any of those wherein recent endocarditis—a fringe of beads, that is to say, surrounding the mitral valve, but no other heart change—is found post-mortem in a choreic child who has never had rheumatism or shown any symptoms whatever of cardiac disturbance. Recent endocarditis, I say, taken alone without articular rheumatism, without pyrexia, and without physical signs, cannot be identified as rheumatic. If it be so found in chorea, as we know it is, it must be accepted as choreic; there is no other place for it.

It would be possible to pursue the same line of argument further by reference to clinical facts indicating the essential difference between rheumatic and choreic endocarditis. For example, it is highly improbable that the latent endocarditis of chorea, such as I have described, is confined to fatal cases. What, then, becomes of it in those cases who recover? If it follow the rheumatic pattern (as some, no doubt, will assert that it does), then chorea should be as fruitful a source of valve lesion as rheumatism, and a previous history of chorea would serve as well as a previous history of rheumatism to account for organic heart disease. It is not the habit of clinical observers so to regard it, nor are there many, I will venture to assert, who will deny that the common rule is for the abnormal cardiac sounds developed in chorea—and which, in the course of it, sometimes acquire a character closely resembling structural murmurs—to disappear altogether on the patient's recovery.

To what conclusions do such arguments tend? Anatomically, endocarditis is the chief, if it be not the sole distinguishing feature of chorea, and in it rheumatism and chorea have a common factor. That is all. In its birth, its progress, and its consequences, rheumatic endocarditis is pathologically distinct from choreic endocarditis. Its occurrence in both affections does not show chorea to be rheumatic any more than it shows rheumatism to be choreic. Keeping in mind the specific character of endocarditis in the two cases respectively, there is no more

carditis set in; this was followed by lobar pneumonia, and the girl died two months after admission, the chorea entirely disappearing on the advent of the pericarditis.

Post-mortem the pericardium was universally adherent, but the adhesions were easily broken down. Recent endocarditis involved all the valves, and both auricles and ventricles were dilated. Middle lobe of right lung was hepatized. The left lung was œdematous and solid in patches. Both pleuræ were extensively adherent.—Hospital for Sick Children, vol. iii. 182.

ground for saying, as Sir Dyce Duckworth would have us say, that chorea is a manifestation of rheumatism than that rheumatism is a manifestation of chorea. The truth is that both are manifestations, and probably not the only ones, of some underlying condition yet to be defined.

From this point of view, indeed, if I may stay a moment to observe it, considering the indefinite and equivocal nature of symptoms often described as rheumatic, it seems remarkable that rheumatism, or "the rheumatic habit," should be put forward as the chief member and representative of a supposed pathological group, and especially that it should be regarded as the source of chorea. When mental disturbance is so described, there is no want of direct evidence to support the assertion. But it wants some physical basis, and offers no distinct image to the mind as to the mode of causation. When embolism is invoked to the same end, the physical changes suggested are definite and plausible enough, and the hypothesis only wants the sanction of fact. But to attribute chorea to the "rheumatic habit" may mean anything. It is, as we have seen, a statement beyond the reach of contradiction. It asserts nothing and suggests nothing, and no theory of causation has ever been proposed that has long held its ground.

Facts are accumulating which render it probable that the common symptom uniting a group of morbid phenomena we have been long seeking to reconcile and adjust, is arthritis. To narrow that word by any such epithet as rheumatic is misleading, especially in early life. It is time to abandon this easy method of lumping together the joint pains of chill, of fatigue, of growth, of certain ill-defined neurotic states, and, it may be added, of chorea itself. A certain disposition of body, so to speak, may show itself in chorea at one time of life, in rheumatism at another, in subcutaneous nodules or nervous arthritis at another. "Any form of nerve lesion," says Dr. Weir Mitchell, "the brain included, may develop in the joints conditions so precisely resembling rheumatic arthritis that no clinical skill can distinguish them." To set up one of these conditions above the others, to make one the parent of all the rest, is not only gratuitous, it is proved to be incorrect by the separate behavior of each. So it is, indeed, elsewhere. Evidence of kindred is not wanting in other morbid groups besides that which includes rheumatism and chorea, and over which rheumatism is assumed to preside, yet we do not, after the same arbitrary fashion, select one out of the group and subordinate the rest as its manifestations. Thus, when labial herpes occurs, as it often does, without lung signs, no one would say that it is a manifestation of pneumonia. But it is most reasonable to say, in virtue of their frequent concurrence and parallel symptoms, that these two affections are allied in their pathogenesis.

But apart from the argument supplied by endocarditis in its relation to chorea and to rheumatism respectively, there is, I think, a further reason for supposing that chorea and rheumatism are two members of one family. It is afforded by the fact of their close alliance in early childhood. They separate more and more widely as life goes on, the differing circumstances of the two serving to draw them apart until, at length, the signs of kinship are hardly discernible.

Some three years ago I had the good fortune to encounter chorea at an unusually early time of life[1] in a girl a month under three years of age. A year before her birth the mother, aged thirty-seven, had acute rheumatism. The father, aged forty-three, was said to be "rheumatic." The child had been very "nervous" since an accident, starting and screaming in sleep and tossing the arms and legs about. During the last month she had been weak and uncertain on her legs, and on admission she was unable to feed herself. The patient was extremely emotional, and choreic movement was pretty generally distributed over face, hands, and feet; the right arm was partially paretic. Now this child, though with no open sign of rheumatism, had at the heart's apex in the fourth space, half an inch within the left nipple line, a loud and (on admission) musical systolic murmur conducted into the axilla and heard distinctly behind; evidence, that is to say—congenital heart disease being excluded—of endocarditis, not choreic, but rheumatic.

In the previous year I published the case of a girl,[2] three years and six months old, and with no family history of rheumatism, who became my patient for slight choreic movement of the right hand and arm, with imperfect control of the right leg and difficult speech. She, too, had a loud and conducted systolic murmur, with feeble thrill. Three weeks before admission the child had been noticed to be "feverish," and the night before the movements began she had been frightened by a quarrel between her parents. In the second week of the child's admission a pericardial friction rub was detected, and the chorea ceased. Presently the back of the right hand was found to be swollen and painful; the left wrist followed, two subcutaneous nodules appeared, while at the same time the heart became uneven and the area of its dulness increased upward. The patient ultimately died, and no post-mortem examination was permitted. We had ample evidence, however, not only of rheumatism and endocarditis, but of pericarditis also. The case was, in fact, an example of rheumatism, with its usual cardiac accompaniments. It was, at the same time, intimately connected with chorea, and the subject was exceptionally young.

I need not repeat here the figures quoted in the paper referred to,

1 Lancet, January 21, 1888.

2 "The Rheumatic Element in Chorea," Archives of Pædiatrics, May, 1887.

showing (1) the rarity both of rheumatism and chorea under four years of age, and (2) the frequent and intimate association of these two affections at this exceptionally early period of life for the occurrence of either. A mere numerical statement, indeed, does not disclose the full strength of the case, unless the intimacy of the connection is considered as well. My own personal testimony[1] is to this effect: In 177 cases of chorea there are eight under six years old; *all but one are girls.* One of these must be omitted owing to defective information. Of the seven only three were certainly exempt from rheumatism. Three certainly, and a fourth probably, were rheumatic. Add to this the only examples procurable, so far as I know, below the age of four, the two I have just quoted, both showing chorea and rheumatism intimately associated, and the conclusion is not to be resisted that the rheumatic element is conspicuous in the chorea of very young children, almost all of them being girls.[2]

Now, if chorea be considered without reference to age, this close connection with rheumatism is less apparent. It is seen chiefly, as I have said, at that early period of existence when the two affections are first discernible. As the time of life approaches when chorea becomes rare, while rheumatism—the acute polyarthritis rheumatica of young men and young women—attains its fullest development, this near connection is rarely seen. That the interval which separates these two affections should thus go on widening with growth, so that in the end sometimes rheumatism, sometimes chorea, emerges (not to speak of forms of neurotic arthritis, of which we know little), is not wonderful when we consider that each of these affections has its own separate exciting cause, and that each, once excited, is very apt to recur. The accidents of life will favor one rather than the other—exposure tending to rheumatic arthritis in one case, mental strain to chorea in another. In early life, when the affinity is the strongest, and before these separating causes have come into operation, rheumatism and chorea may alternate. But chorea tends to die out with puberty, while rheumatism waits for puberty for its fullest development. Every repetition of the latter affection strengthens its hold and enlarges its clinical features—the rheumatism of seventeen being more express and distinct than that of seven. Meanwhile the natural disposition to chorea is weakening, and the time of life approaches when it ceases altogether.

The several points I desire to affirm are these:

1. Recent endocarditis, with no further heart change, is the cardinal anatomical feature in those dying with chorea without reference to

[1] Chorea, p. 180.

[2] The single case quoted by Dr. Dickinson (loc. cit.) under five was in immediate connection with rheumatism, "general articular rheumatism just before chorea."

rheumatism. Yet it is not constantly found, and some of the most striking examples of deaths by chorea are without it.

2. Choreic endocarditis is distinguishable from rheumatic endocarditis both clinically and anatomically. Clinically it is without physical or general signs, often without rheumatism, and only disclosed post-mortem. Anatomically the inflammation is recent, its chief, often its only seat, is the mitral valve, and there are no consecutive changes in the heart. The contrast to this condition is seen in rheumatic children with valve disease who are or who have been choreic. In them the physical signs observed during life correspond with well-recognized changes in the valves and heart chambers found after death and due to the rheumatism and not to the chorea.

3. Choreic endocarditis, therefore, is not accurately described as a manifestation of rheumatism. Both chorea and rheumatism are liable to this inflammation, each after its own manner. The common feature may be taken as evidence that the two affections are pathologically allied, not that either of them is a form or expression of the other.

4. The fact of this alliance is best seen by the observation of chorea in very early life, at which period it is often intimately associated with rheumatic polyarthritis in the same subject and at the same time. But with growth, in obedience to the natural history of the two affections respectively, and influenced by the several accidents of life, this association is relaxed, and at puberty it has ceased to be intimate.

5. Both chorea and rheumatism are, it is probable, members of a pathological group which has arthritis for a common factor, and of whose underlying source we are yet in search.

JACKSONIAN EPILEPSY; TREPHINING; REMOVAL OF SMALL TUMOR, AND EXCISION OF CORTEX.

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Medical History by Dr. Mills.

S. W., female, twenty-seven years old; height, five feet; weight, ninety-eight pounds. Until the first symptoms of the spasmodic affection for which she applied for treatment she had been in excellent health, with the exception of an attack of chronic otitis when a child, which had left her with a perforated membrana tympani and the occasional recurrence of a slight discharge. Ten years before coming under observation, while in a cold room in the northwest, she had for the first time a slight

attack of left hemiparæsthesia; her left hand, arm, and foot became numb and heavy. The sensation passed off in a few moments and was not accompanied by spasm or vertigo; but from this time, at intervals of weeks or months, she had attacks, usually slight, of the same character. Handling or unusual movements of the left arm would sometimes bring them on; at other times they would come on without any apparent exciting cause. Between four and five years after the first of these sensory seizures, she had for the first time, as an accompaniment, a spasm involving both the left upper and lower extremity, but more marked in the former. From this time on she had at irregular, but more frequent intervals, these sensory and motor attacks, the spasm beginning on the left side, but after a time markedly attacking the right arm as well. The seizures increased in frequency, until after a few months she had them almost every day, and often six or seven during the twenty-four hours. The only time when she was free from them for a long period was in the spring of 1890, when, while suffering with a fever, she had no attacks for about three weeks. Although the attacks increased in severity and frequency, they had for many months remained much the same as they were when she first came under observation. She had been treated by various physicians, and on several occasions bromide treatment had been pushed, but always without any improvement, and usually she thought she grew worse under the use of drugs. She was sent to me for diagnosis and treatment by Dr. H. C. Yarrow, of Washington, D. C. Her general health, mental and physical, was good, and she had no evidence of paralysis.

Soon after coming under observation I had several opportunities of witnessing her seizures, and one description would answer for all, with the exception that sometimes her consciousness was more deeply affected than at others. She would feel a prickling sensation in her left arm, and would utter a plaintive cry. The left arm would immediately extend at the shoulder and elbow, and almost coincidently the left leg would become spastic in extension, and the head would be twisted to the right.

The right upper extremity would then be strongly flexed at the elbow, and the whole limb carried over the chest, as if the hand was grasping at the precordial region. The spasm continued for a few seconds, passing off with a laughing sound and facial expression. In the shortest attacks she did not appear to lose consciousness at all, and during the early weeks that she remained under observation she never seemed to be completely unconscious during the seizures, and could detail most of what was said and done by others during them. She sometimes complained of having pain in the precordial region. She repelled any touching or handling during the spells, and explained afterward that it hurt her and made her worse.

At first the case was regarded as probably one of hystero-epilepsy, and the patient was treated with tonics and gymnastics to improve her general and nervous health, but in spite of such treatment and the best of care her attacks grew more frequent and severe. About three months after coming under observation, an attack, which began in the usual manner, became extremely violent, and was attended with total unconsciousness. In November the patient began to have day and night as many as ten to fifteen serious attacks. After several consultations with Drs. Mitchell, Keen, Sinkler and Lloyd, it was finally decided that an operation should be performed.

In deciding on a site for operation the history and character of the sensory and spasmodic attacks were carefully considered. The case had begun with sensory disturbance in the limbs of the left side, particularly in the upper extremity. The spasm had first affected this side, and usually, as nearly as could be determined, was initiated with a shoulder movement on this side, although the spasm diffused and extended so rapidly to all parts of the left arm and leg, and to the right upper extremity, that it was sometimes difficult to determine how it began. Sometimes, however, the right side escaped. On the left side the patient showed slight drooping and apparent weakness of the muscles about the mouth, although this was so little marked as to be scarcely more than is not infrequently present normally.

Operation was performed December 10, 1890, by Dr. W. W. Keen. The following were present at the operation: Dr. Roswell Park, of Buffalo; Dr. Raphael Lorini, of Washington; Drs. W. J. Taylor, Wharton Sinkler, J. H. Lloyd, F. X. Dercum, J. B. Deaver, De F. Willard, M. I. Bassette, and J. W. McConnell.

On the day preceding the operation Dr. Bassette examined the patient and made the following report of her condition: Pupils normal; slight drooping of the left upper lip, but otherwise the face normal; no paralysis of the limbs; no impairment of touch, sight, taste, or smell. Hearing much impaired on the left side. Dr. C. S. Turnbull had previously examined her ears, and had reported a chronic otitis media with perforation, which required but little treatment, and which he thought had nothing to do with her brain symptoms. Knee-jerk was present; no ankle clonus. Heart and lungs were normal.

Surgical History and Remarks by Dr. Keen.

On the day before the operation the carpet was taken up, the walls wiped down, and the floor, woodwork, etc., were washed with a solution of carbolic acid, 1 to 40. The patient's head was shaved and carefully disinfected. The position of the fissure of Rolando was outlined first by means of Hare's method, and then by that of Horsley, the cranial index being determined from measurements made as follows:

Antero-posterior diameter 19.1 cm.; biparietal diameter 14.3 cm. $14.3 \div 19.1 = 0.748+$. Practically the cranial index was therefore 0.75; and this corresponded to an angle of 69° for the Rolandic fissure. From glabella to inion was 13.25.

The position for the trephine centre was fixed 1.75 inch to the right of the median line, in the line of the fissure of Rolando and was marked on the scalp by a small puncture in the bone. The fissure of Rolando was also marked at its two extremities by two similar punctures in the bone, so as to identify it after its surface marking was lost by the lifting of the flap.

A large horseshoe flap was made, and on turning this back no abnormal appearances of the skull were found. The centre pin of a 1½ inch trephine was now inserted 1.75 inch from the median line as before determined, the upper edge of the trephine reaching to a point 1 inch from the median line.

Dr. Roswell Park kindly did the trephining for me, so that my hands should not be unsteadied by the muscular fatigue involved in this part of the operation. It was very fortunate that I asked him to do so,

for the skull was very thick and the trephining required time and a good deal of muscular effort. The thickness of the button removed varied from $\frac{5}{16}$ inch to $\frac{7}{16}$ inch, and the diploë was almost entirely obliterated. The under surface of the button of bone was eroded in a number of connected small pits corresponding to the small growth described below. The little pits resembled a miniature bunch of grapes, the stem of the

FIG. 1.

The button of bone removed, showing its thickness and the erosion caused by the tumor of the dura and the vessel supplying it.

bunch consisting of a vessel of considerable size which had also eroded the bone. On the removal of the button of bone, free hemorrhage took place from the dura at the margin of the trephine opening where this vessel ran, but the bleeding was soon controlled by a ligature. The tip of the growth was $\frac{1}{16}$ inch in front of, and the same distance internal to the centre of the trephine opening. The growth was elevated $\frac{1}{4}$ inch above the surface of the dura, and after cutting the dura and lifting the flap, it was found that the granulation or growth had its origin apparently from the pia, and had bored through the dura and formed a nest for itself in the skull. The dura and the pia were adherent at the point where the growth lay.

A triangular bit of the dura, including the growth, was removed by the scissors and placed in Müller's fluid. The exposed pia-arachnoid was œdematous with enlarged veins and capillaries. Nothing else abnormal was found. A fissure corresponding to the line of the fissure of Rolando was seen, and five convolutions were exposed, all of which appeared to be normal. (See Fig. 2.) From the moment that the brain was exposed no antiseptics were applied to it, but only warm, boiled water.

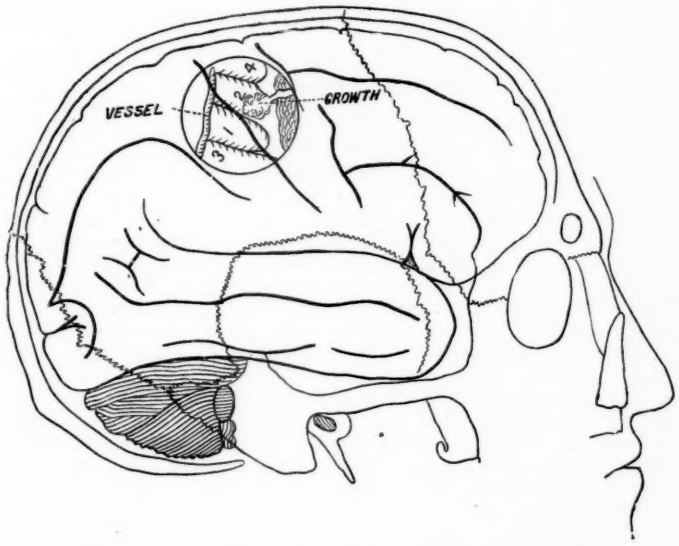
Careful investigations were then made with the faradic current with a view of determining the cortical centres exposed. A small bipolar antiseptic electrode was used. A secondary current was applied; the electrode was connected with the terminal of a Flemming faradic battery, and the current was obtained by passing the switch to the first button of the instrument, and withdrawing the regulating cylinder to a distance of $2\frac{1}{4}$ inches.

Several spots were selected, marked 1, 2, 3, and 4 (see Fig. 2). The first electric tests were made at the spots 1 and 2. From the measurements that had been made, the fissure of Rolando was in the direction indicated by the line seen in the illustration.

Electricity was first applied to the spot marked 1 for a moment only.

Movement at once resulted, beginning in the upper extremity on the left side, the first movement being protraction and moderate adduction of the shoulder and upper arm. This was followed by a series of jerks, involving the upper, and to a more moderate degree, the lower arm. No differentiated movements of the hand and arm, and no face or upper leg contractions, were observed. The left toes and foot, however, slightly flexed coincidently with the shoulder movement.

Fig. 2.



A second application was made at the point marked 2. The effect of this excitation was again to produce decided shoulder and arm movements, with greater adduction and some protraction of the entire arm. The thigh was flexed upon the pelvis at an angle of about 130°, and the leg upon the thigh to about the same, with abduction of the thigh and extension of the toes and foot. At the same time, active, coarse, clonic movements diffused through both extremities. This series of movements of the left upper and lower extremities strongly resembled the spasms which occurred in the patient's ordinary attacks, with the exception that the head was not turned to the right, and no face movements were noted. The application was repeated at 2, with similar results, with the addition that the face and head turned to the left, and the head was drawn downward and to the left, chiefly by platysmic action.

The electrical tests clearly indicated that the centres for the shoulder, upper arm, thigh and knee had been determined, or probably the region which represents the merging of the movements of the upper and lower extremities. A consultation was held with reference to the propriety of excising this region, and it was determined to do this, first, in order to

make a sub-cortical exploration for any further lesion, and secondly, to prevent the recurrence of the spasms by removing what seemed to be their primary seat.

With a pair of scissors and sharp bistoury a portion of the cortex, three-quarters of an inch in diameter, was removed. It included all the cortical gray matter under the tumor and corresponding to the centre for the shoulder as ascertained by the battery. The arm, leg and face were carefully observed during excision, but this mechanical excitation was absolutely without effect in producing movements.

After excision the electrodes were now applied to the points 3 and 4 on the border of the excision.

Excitation at the point marked 3 flexed the elbow, hand and wrist with slight shoulder abduction, protraction closely following.

Excitation at 4 caused primary movements of abduction and flexion of the thigh upon the pelvis, and the leg upon the thigh at an angle of 135° or 140°. No foot movements or movements of the upper extremities occurred. In all the trials after the excision of the cortex the movements were confined to the left half of the body.

After the excision had been performed considerable trouble arose in checking the hemorrhage from a large vessel, but this was controlled by two ligatures passed into the brain, and by temporary packing with iodoform gauze. During the operation small bits of iodoform gauze were packed between the dura and the skull to check some hemorrhage. The pulse fluctuated markedly, becoming for a short time weak and rapid. The extremities also became cold. The hemorrhage having been checked by pressure and hot water, after the ligature referred to had been applied, a small rubber drainage-tube was inserted through the defect in the dura. A small bundle of horsehairs was also passed through and through under the flap, which was then sutured into place and dressed as usual. The bone was not replaced, as this was not deemed wise in consequence of its thickness and its sclerosed condition.

On December 11th, the first day after the operation, the drainage-tube was removed. On the 13th, the third day, the horsehair was removed, and a slight escape of cerebro-spinal fluid occurred. On the 15th, the fifth day, nine stitches were taken out and five were left. On the 21st, the eleventh day, the last stitches were removed from the wound, which was entirely healed except at one or two of the stitch-holes and where the flap was at a slightly different level.

Temperature record for ten days after operation.—December 10. 4.40 P.M., 96.6°; 8 P.M., 100.6°.

11*th* (first day after operation)	8 A.M., 99.8°	4 P.M., 99.4°	8 P.M., 100.2°.
12*th* (second day)	" 100.2°	" 100.4°	" 100.2°.
13*th* (third day)	" 99.2°	" 99.4°	" 99.4°.
14*th* (fourth day)	" 100.6°	" 99.2°	" 99.2°.
15*th* (fifth day)	" 98.4°	" 99.2°	" 99.4°.
16*th* (sixth day)	" 98.4°	" 98.8°	" 98.6°.
17*th* (seventh day)	" 98°	" 98.8°	" 99.2°.
18*th* (eighth day)	" 98°	" 98.8°	" 98.6°.
19*th* (ninth day)	" 97.6°	" 99°	" 98.6°.
20*th* (tenth day)	" 97°	" 98.6°	" 98.8°.

REMARKS.—The bone was so much thickened and sclerosed as to raise the question whether there was not possibly an element of hereditary syphilis in the case, but this it was learned could be positively excluded. In the absence of such an explanation it was, of course, possible that the thickening of the bone was due to the irritation caused by the pressure of the little growth. Whether it was only a local thickening could not be accurately ascertained at the operation. In either case it seemed unwise to replace the bone.

Accuracy of localization. The accuracy of the localization of the shoulder centre and also of the centres in its neighborhood is worthy of remark. The tip of the growth was found within one-sixteenth of an inch of the point selected as the location of the shoulder centre and the probable seat of the irritation.

The nature of the growth. Its appearance suggested that it was a hypertrophied pacchyonian body, but the microscopical examination showed that it was sarcomatous, with some hemorrhagic pachymeningitis. That it was the probable cause of the epileptic attacks seems very reasonable. Unfortunately, the irritation had possibly continued long enough to establish the epileptic habit, and to this may be due the fact that the attacks have continued since the operation, though with lessened frequency and severity; or, as suggested by Dr. Mills, sarcomatous growths or infiltration may be present elsewhere in the brain. Whether the attacks will ultimately disappear or not is a question which we are not yet in a position to decide.

Excision of the cortex. The operation might have been limited to the removal of the growth and the dura which contained it, and then later, had the attacks not disappeared, a second operation might have been done and the shoulder centre removed. Against this, however, is the argument that a second operation involves a second peril to life, and also that the convolutions might be so adherent to the flap and the new tissue which would fill the opening, that it might be difficult at the second operation to recognize them, and to delimit the centres to be removed with the same accuracy that we could at the primary operation. All the questions which present themselves on reflection upon such cases should be stated with a view to their consideration, and the determination of what is the wisest course.

Drainage. Since this operation was done I have operated on a number of cerebral cases, with absolute closure of the wound without drainage. In two cases there has been considerable accumulation of bloody serum which has been evacuated by gentle separation of the flap between the sutures. In one case this had to be done four times, and in the other but once; so that I am now quite convinced that, as a rule, drainage can be dispensed with in cerebral operations. Had it been dispensed with in this case the apparent risk of a fungus cerebri would have been

avoided. In fact, I think this one of the strongest reasons why drainage should not be employed in cerebral cases. Possibly a few strands of horsehair might be used to advantage for twenty-four hours, but a drainage-tube should not be used.

After removal of the dura, cannot the loss of substance be made good by the transplantation of a piece of the pericranium? In the after-history of the case one point was purposely not mentioned, but reserved for consideration here. A few days after the operation the flap bulged to such an extent that I was afraid that the union of the flap to the rest of the scalp would give way, and that a fungus cerebri would appear, especially at the site of the drainage-tube. Fortunately, this did not occur, but the bulging gradually subsided and the wound healed without incident. In reflecting upon this case, it occurred to me that the conditions were most favorable for the formation, almost inevitably, of a fungus cerebri, which I believe actually took place subcutaneously, but fortunately subsided without appearing on the surface. Under the flap was a deep well, corresponding to the thickened bone, the dura, and the excised portion of the brain; in depth perhaps an inch or more.

When the dura is opened and closed by suture there is little danger of a fungus cerebri, but where there is a loss of substance of the dura, and especially where the cortex is excised, there is a marked tendency to the formation of a fungus cerebri, especially where the distance between the scalp and the surface of the excised portion of the brain is as deep as in this case. To avoid this it occurred to me that we had ready means at hand in the transplantation of a piece of the pericranium similar to the transplantation of skin by Thiersch's method.

On the 10th of May, 1891, in another case operated upon at the Jefferson College Hospital, an opportunity occurred to me to test this. A piece of the pericranium was separated from the scalp, cut loose, and attached by a few interrupted sutures at its margin to the dura, thus filling the gap produced by the excision of a piece of the dura. The transplanted bit was turned upside down, so that the osteogenetic surface lay upward, in order that if bone should form from it, it should grow upward into the gap in the skull, rather than downward, and so possibly press upon the brain. The result was all that I could wish. No fungus cerebri formed, and up to September 1st he had not only been entirely free from his epileptic attacks, but no mischief had arisen from the transplanted pericranium, which presumably therefore has retained its vitality.

Can we differentiate normal from apparently normal, yet, in fact, diseased cortex, by means of the battery? This question I cannot yet answer positively, but I am inclined to think that it may be answered possibly in the affirmative. If we faradize a normal cortical centre (motor) by a single application, for a moment we get response in a single motor ex-

pression of its function, and the muscles cease to respond the moment the electrodes are removed. In several cases of visibly diseased cortex, by a similar single and short application of the electrodes, I have evoked not a single motor response, but have started an epileptic fit, resembling in the part in which it started and in its march the fits from which the patient had suffered. After excision of the diseased cortex similar brief stimulation has produced only the normal single motor response. It may be that this is explained by the fact that the first stimulation was of gray matter, and the last of white matter after the excision of the former. In some cases in which I have operated on the brain after injury and loss of brain-substance, presumably cortical (chiefly so, at least), faradization of the diseased and disintegrated brain-substance, presumably chiefly white matter, has started the characteristic fit, and, after excision, faradization of the underlying apparently normal matter has again given me a single normal response. If, then, faradization of apparently normal cortex induces a typical epileptic fit, instead of a single motor response, can we conclude that, though normal to the eye and finger, it is really diseased and should be excised? If so, this will be a most important and valuable aid to us.

My observations on this point are yet too few to warrant a definite conclusion.

Medical History After the Operation, and Certain Special Features of the Case, by Dr. Mills.

History of loss and recovery of power in the left limbs after the operation; sensory investigation. When the patient came to from the effects of the ether, she had a feeling of numbness and heaviness in the left arm and hand, and also at times in the back of the left shoulder—what she described as a "battery sensation," or a feeling of prickling. Five hours after the completion of the operation she was cautiously tested for motion and sensation. The tests were not elaborate, for fear of disturbing her too much. The left shoulder movements were paralyzed, but all the forearm, hand, and finger movements were retained, but weak. The power of flexion at the elbow was very feeble, probably abolished; extension was present, but much diminished. So far as could be determined, sensations of touch, pain, and temperature were preserved.

December 11 (first day after operation). The loss of power in the left arm and leg were about the same as noted the day before. Dynamometer: Right hand, 50; left hand, 26. Sensation was carefully tested for and found to be normal.

12*th* (second day after operation). The paralysis of the shoulder persisted, that of the upper arm was increased, and the loss below the elbow and in the hand and fingers was more marked. The left leg was growing much weaker; the loss of power was most decided below the knee.

13*th* (third day after operation). The foot movements were almost entirely abolished, but some power of flexion and extension of the thigh remained. The left upper extremity was completely paralyzed. No

loss of sensation could be made out in the shoulder or anywhere in the upper or lower extremities.

From December 13th to 20th (third to tenth day after operation) the paralyzed left extremities remained the same—paralysis was total in the arm and almost so in the leg, the only power retained in the latter being that of pushing the leg downward after it had been thrust upward and held by the examiner. On December 20th (the tenth day after operation) the patient had slight power of extension and flexion of the thigh, and marked increase of power of extending or thrusting the limb downward against resistance. Gradually power returned in the lower extremity, as nearly as could be made out in the following order: Thigh extension, thigh flexion, abduction, adduction. Until January 3d (the twenty-fourth day after operation) no foot movements below the knee returned. At this date signs of flexion and extension at the ankle appeared. January 2d, she could flex the leg over the thigh, and cross the left leg over the right, and could perform, but in a feeble manner, all movements of the foot and leg.

No change was observed in the paralysis of the arm until December 29th (nineteenth day after operation) when, if the forearm was slightly flexed, she could extend it; at this time, as above noticed, she had regained considerable power in the lower extremity. January 1, 1891 (twenty-second day after operation) she began to flex the distal and second phalanges, but had no power of phalangeal extension, and no wrist movements. On January 3d (twenty-fourth day after operation) she could flex, extend and separate the fingers and hand, but had no elbow or shoulder movements. On January 6th (the twenty-seventh day after operation) she gained decided power in flexing and extending the elbow, and on January 7th the (twenty-eighth day after operation) she could elevate the arm nearly in a horizontal line. On January 12th (the thirty-third day after operation) she had regained all movements of both upper and lower extremities, and had been able to walk for several days. The limbs remained weak, and this weakness continued most decided for shoulder movements. All true paralysis, however, had practically disappeared.

The order in which paralysis of different muscular groups appeared and disappeared is of considerable physiological interest.

Knee-jerk was found to be increased on the left side, and ankle clonus was present on the day after operation. Gradually the exaggerated knee-jerk diminished, and on December 23d (thirteen days after operation), when the power of flexing and extending the thigh had greatly improved, ankle clonus disappeared.

History of spasms after operation. At 4.30 P.M, on the day of the operation, the patient had a slight attack without unconsciousness, in which the right arm at the elbow and wrist was flexed, but the arm was not carried over the chest as in the old attacks; the head was drawn to the right. The left extremities and face and the right leg were not involved.

December 11 (first day after operation). She had light seizures at 5, 6 and 8.30 P.M. The spasm affected both arms and the left leg.

12*th* (second day after operation). Attacks at 4, 7.30, 8.30 and 10.30 A.M., and 12.50 P.M. Both arms and left leg were involved in the spasm; the head was drawn to the left. At 7.30 P.M. she had an attack,

the spasm affecting both arms and left leg; the head was drawn to the right.

13*th* (third day after operation). Attacks at 1.35, 5.40 A.M. Both arms and right leg were affected; the head was drawn to the right. She had other attacks in the afternoon and evening.

14*th* (fourth day after operation). Attacks at 6.45, 8.30, 9.30 A.M.; none P.M. Both arms and right leg were involved; the toes were flexed; the head was drawn to the right.

15*th* (fifth day after operation). Attacks at 12.15, 1.15, 7.45 A.M., affecting the arms and right leg; the head was drawn to the right.

16*th* (sixth day after operation). No attacks.

17*th* (seventh day after operation). Attacks at 4.30, 6.45, 7.45 A.M., spasm invading both arms and left leg; the head was drawn to the right.

A careful daily record was kept of the spasmodic seizures until February 1, 1891—that is, for a period of nearly eight weeks after the operation. She averaged four or five attacks daily, occasionally only one, two, or three. The majority of these seizures were in the early morning hours, between 1 and 2 A.M. They were commonly of moderate severity, none of them as severe as the frequent attacks which she had had several weeks just preceding the operation. The character of the attacks was usually as already described, but they varied somewhat at different times. As a rule, both arms took part, the right upper extremity becoming spastic in flexion, the left either in extension or extended and affected with some clonic spasm; the left leg was usually extended, but was sometimes flexed. The right leg, when included in the spasm, was usually semi-flexed at the hip and knee. During the week from January 26th to February 1st, the average number of seizures was somewhat smaller, on the 26th being only three, on the 31st two, and on the other days three, four, and five. So far as the distribution of the spasm in different parts of the body was concerned, their severity was somewhat influenced by the varying degrees of loss and recovery of power on the side paralyzed after the operation. About three days after the operation, as will be recalled, the paralysis of the upper and lower extremity was almost complete, and for several days the left leg took little part, or no part, in the spasm, taking, however, an increasing part as power was recovered. The same was true of the left arm. During most of the time that these notes were taken the spasms preponderated on the right side, the morbid ascendancy of the left side, however, reasserting itself as power was more and more recovered.

This patient has been seen at longer or shorter intervals from the time of operation—December 10, 1890—to July 7, 1891. Her history has been a monotonous one, and can be condensed into a few sentences. Usually she has had about three attacks of spasm in twenty-four hours, these, as a rule, occurring during the night, most commonly in the early morning hours. Sometimes she has had an attack after daylight, between 6 and 8 o'clock in the morning. Occasionally she has had two attacks in succession. The spasms have never attained the severity or frequency which they had for a short time prior to the operation. She had then as many as twelve to fifteen in twenty-four hours, often with total unconsciousness, involuntary urination, and subsequent great dazing and confusion of mind. At the time of the last examination and report, and for some time previous, the attacks usually began with a feeling of numbness in the left shoulder and a lifting and jerking movement

of the entire left arm. The spasm spread, involving the left side and sometimes also the right side. Sometimes she was unconscious in the attack, but as often not. She now has good use of both the left arm and the left leg, all movements being preserved. The left arm, however, shows some general weakness, is easily fatigued, and the patient thinks that over-use of it brings on the spells. Her general health is good—better than for a long time—and she has gained from five to ten pounds since the operation.

The small growth of granulation, with the attached piece of dura mater, and also the excised segment of cortical and subcortical tissue, were placed in the hands of Dr. Allen J. Smith for microscopical examination. Dr. Smith has prepared six slides showing the appearance of the membrane, growth, or granulation, and of the excised cortex. He reports that connected with the growth or granulation are spots of hemorrhagic pachymeningitis, and several points in its interior which are decidedly sarcomatous. He also reports that beyond the engorgement of the vessels and the presence of hemorrhage at the surface, and at one point at the margin, that the excised cortex was apparently normal.

At the time of the operation the general impression of those present was that the small growth was a large, isolated, pacchyonian granulation, which had perforated the dura and eroded the inner wall of the skull. The microscopical examination throws a doubt upon that view, and makes it more likely that after all we had a real neoplasm of very small size; but perhaps, without further investigation, the question may not be regarded as absolutely decided. If the growth was sarcomatous, other sarcomatous foci may be present in the brain; and it was in part because of the suspicion that a subcortical mass might be present that the cortex was excised. It is not improbable that the other hemisphere may contain a growth, as the localizing symptoms were at times confusing. The patient had clonic spasms of the right arm, although, as has been stated in the clinical history, the symptoms began on the left side and the attacks were initiated by both sensory and motor disturbances on this side. Since the operation right-sided spasms have often been a striking feature.

Supposing that the small tumor was a pacchyonian formation, it would be by no means certain that this had not to do with the causation of the spasmodic phenomena; and still another view that might be taken is that such a formation had resulted from the frequent and long-continued localized cortical discharges with their accompanying hyperæmia. The question of pacchyonian formations in general, and particularly of those which we sometimes see either isolated or in small groups, may have some importance in connection with the subject of cortical epilepsy and paresis.

The nature of these granulations is probably still an unsettled matter. Little, at least in late years, has been written about them; but an interesting article is that by W. Browning,[1] from which I may cull a few

[1] The American Journal of the Medical Sciences (n. s.), vol. lxxxiv., October, 1882, p. 370.

facts and views applicable to the present case. These formations grow from the pia-arachnoid, both over the sulci and over the crests of the convolutions. It seems to be universally admitted that these formations are limited to certain parts of the pia-arachnoid, showing a decided preference for the sides of the longitudinal sinus and the vicinity. Some, but not all, of these granulations are connected with the veins and sinuses.

Other structures connected with them are the parasinoidal spaces, which occur along the sides of the longitudinal sinus, and are of the largest size at the crown of the head. Browning suggests that these are important accessories to the veins and sinuses as regulators of the cerebral pressure. Sometimes the pacchyonian granulations and parasinoidal venous spaces are combined and connected. When venous spaces are present the granulations are not likely to cause depressions in the skull. It would seem from these facts that whether a pacchyonian granulation would or would not cause greater or less cortical irritation might depend upon its peculiar location, and the presence or absence of venous spaces into which it could grow. A growth such as was found at this trephining may have caused considerable irritation.

On the other hand, as already intimated, such a formation may have been the result of repeated discharges of the adjacent cortical area. As Browning states, and as I can verify from abundant experience at the Philadelphia Hospital, many morbid conditions may favor the development of these bodies, one of which of great importance is chronic alcoholism. This writer also states that in cases of brain tumor an excessive development of these pacchyonian bodies has often been found. They have often been found in adults and children suffering from meningitis, and probably some granulations, particularly those associated with meningitis, may be inflammatory in origin, and in reality somewhat different from the usual pacchyonian growths. Formerly they were all regarded as inflammatory. Browning shows that, while much evidence may be had in support of hyperæmia as their cause, some facts do not harmonize with this hypothesis. He holds rather to a mechanical cause, depending in some way upon the ebb and flow of the blood of the veins just above the sinuses. It is not hyperæmia of the venous blood as such, but the blood acting as any other fluid of its consistence would do.

Some clinical symptoms have been attributed to pacchyonian granulations, but only a few can with any positiveness be regarded as due to these formations. Browning refers to cases where such granulations were present near the Gasserian ganglion and the motor nerves of the eye, causing ocular neuralgic and paretic symptoms. Meyer refers various neuralgias to them. Headaches have been attributed to them in some instances, but with doubtful propriety. Possibly they may cause sinus thrombosis. They sometimes produce little flat elevations of bone along the median

line of the crown of the head. I do not know of any record of cases of spasm, local or general, which could be clearly attributed to pacchyonian bodies. Browning refers to a varix of the sinus longitudinalis which he believed developed from the parasinoidal spaces, and quotes a case of Meschede in which a patient had suffered from epilepsy for thirty years, and after death a varix the size of a bean, which had reduced the bone to paper thickness, was found.

THE BILATERAL PARESES AND PSEUDO-PLEGIAS OF CHILDHOOD, WITH SPECIAL REFERENCE TO A TYPE OF MALARIAL ORIGIN.

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The occurrence of partial paralysis in childhood is not very infrequent, though its interpretation is still a subject of dispute. As the lower extremities are principally and most often affected, only the various incomplete and pseudo-plegias (parapareses) will here be considered. If those known to be dependent on marked organic changes (neuritis, myelitis, bone-disease, etc.) be excluded, the remaining types that claim recognition may be grouped into two general classes:

A. Reflex. It is this class of assumed reflex origin that has so many times offered a field for discussion. Some of the best authenticated types of this are briefly recapitulated under the first four sub-heads below. The cases on which they were originally founded were many of them observed in the adult; still it is reasonable to suppose that like causes might produce quite as severe results in children.

B. Resulting from systemic conditions (toxic?). Whether such a distinct class is wholly warranted, it has a sufficient clinical-etiological basis for present convenience.

A. Reflex Parapareses.

1. *From Injury to Peripheral Nerves.*

Such acceptance as this form has received must be attributed to the great weight of Weir Mitchell's authority. But the cases that he relates (*N. Y. Med. Journ.*, February and March, 1866) do not, so far as the present subject is concerned, bear any close scrutiny. He says on p. 402: "Among some two hundred or more of carefully studied instances of wounds of nerves, we have met with only seven cases of reflex paralysis of remote organs, in which the influence was prolonged or severe."

The phenomena occurred, not in cases where some large nerve was injured, but from wounds of other soft parts, or from slight and indirect injury to nerve-trunks. There does not appear to have been any authoritative observation of these cases at the most important period, viz., directly after the injury, and as (p. 423) "in almost every instance some relic of the paralysis existed even after eighteen months or more from the date of the wound," it is quite as reasonable to suppose that the assumed reflex was the result of some organic lesion. One of his cases was wholly sensory, and in most the reflex was to an upper extremity. In but one were both lower extremities reflexly affected (Case IV., Injury of Testicle), and as this was in an adult its interest here is but theoretical.

2. *From Genital Irritation.*

Sayre's writings on this subject are well known: (*a*) "Partial Paralysis from Reflex Irritation caused by Congenital Phimosis and Adherent Prepuce," *Trans. Am. Med. Assn.*, 1870; (*b*) "Spinal Anæmia with Partial Paralysis and Want of Coördination from Irritation of the Genital Organs," *Ibid.*, 1875; (*c*) "On the Deleterious Results of a Narrow Prepuce and Preputial Adhesions," *Trans. Ninth Internat. Med. Congress*, 1887.

These titles indicate briefly his views. They have been variously corroborated (as recently, 1888, by Reverdin and by Pinto Portello), but also justly criticised (*e. g.*, by Gray in *Annals of Anat. and Surg.*, January and February, 1882). The evidence so far offered is not very convincing as to the reality of such paralyses or their dependence on the cause assigned, and still less of the proposed explanation (spinal anæmia). There is not much uniformity of type in the reflexes described; nor, strange to say, have such observations often been made in nerve clinics. In the profession, however, there is a widespread belief that cases like those given by Sayre do occur, and it is possible that peculiarities in the published descriptions have prejudiced many authorities against the whole matter. Considerable inquiry amongst the most careful observers in Brooklyn has failed to discover any case showing paraplegic phenomena, although a couple are noted in which other troubles seemed to have been favorably influenced by circumcision.

3. *In Certain Cases of Spina Bifida.*

It is well known that a variety of paralytic and spastic troubles, including foot deformities, perforating ulcer (Kirmisson, 1887), etc., frequently accompany this defect in spinal development.

In a case published by Dollinger in the *Wien. med. Wochenschr.*, 1886, No. 46, there was urinary and fecal incontinence, with contractures in the lower extremities, etc. Puncture and withdrawal of fluid produced each time temporary relief, and osteoplastic closure of the spinal open-

ing was followed by lasting improvement. Apparently quite independent of this, Zenenko, of St. Petersburg (*vide* abstract in *Annals of Surgery*, September, 1889, p. 223, 224), relates a case of sacral meningocele in a boy of fifteen years, with incontinence of urine and feces, "extreme wasting of the muscles of his lower limbs, and flexory contractures in the knee-joints." Here also an osteo-plastic operation on the vertebral cleft—after extirpation of the tumor, some integument, and loops of the cauda—led to a fairly complete recovery.

Cockburn (AMERICAN JOURNAL OF THE MEDICAL SCIENCES, August, 1890) gives the case of a vigorous boy of nine weeks. "This tumor was but slightly reducible, and pressure on it elicited none of the nervous symptoms which are produced by pressure." It was found on operating to connect by a pedicle through an opening in the first sacral vertebra. "The hips were then raised and the tumor compressed, in order to return as much of the spinal fluid within the membranes of the spinal cord as possible, and a stout catgut ligature was now tied around the pedicle. At the moment the ligature was tightened a sudden and rigid extension of the lower limbs took place, and also a marked change in the respiration." On removing the ligature these symptoms soon abated. "The cauda equina was found included in the ligature. . . . About three-fourths of an inch of the extremity of the cauda with the adherent dura was excised." Recovery without further nervous symptoms.

The fact that various cases of spina bifida have been cured as to the tumor, yet without relief of coexisting paralytic conditions, in no wise detracts from the significance of the cases quoted. In those of Dollinger and of Zenenko it was observed that the sheaf of nerves constituting the cauda was stretched out over the tumor-sac, and it was to the irritation produced by this tension on the nerves that these writers attributed the symptoms from the side of the lower extremities and pelvic organs.

A close relationship might be inferred between these cases and those of genital reflex. The sensory path from the prepuce and adjacent parts passes up through the cauda (third sacral nerve according to Thorburn, 1888). The symptoms noted by Sayre in some of his cases are not unlike those seen at times in spina bifida—only less severe. Hence, the morbid phenomena in the apparently quite separate classes of cases *may* be due to irritation of the selfsame set of nerve-fibres. But such symptoms are not the rule, even in apparently like cases of spina bifida; and where they do occur it is more rational to conclude that not the tension on certain nerves as such, but the dragging at the nerve-roots, and hence direct irritation of centres in the cord, is the real cause.

It might seem that the correct explanation could be decided by anatomical considerations. For, whilst a reflex impulse would at the cord choose functionally rather than physically related parts, direct pulling

would probably exert its maximal effects on the nearest centres. But in these few cases the morbid conditions are so complicated that little light is thus obtainable.

4. *From Visceral Irritation.*

Brown-Séquard, in his *Lectures on Paralysis of the Lower Extremities* (Phila., 1861 and 1873), as is well known, divided all cases of paraplegia into those of central and those of reflex origin. Since the time of his writing our knowledge of this subject has greatly increased, especially as to the important part played by neuritis of various kinds. Moreover, the irrelevancy of his cases of reflex—from enteric, intra-pelvic, pleuritic, and other troubles—was long since shown by various writers. To discuss this matter by later published reports would require a special paper.

The following case well illustrates the easy possibility of error. A girl of four years was brought to the dispensary in May, 1889, with the history that for two and a half years she had been subject once or twice a month to attacks of loss of power in the lower extremities, accompanied by fever (101°–102° F.) and a tendency to lie on the side or abdomen with feet drawn back toward head. Treatment was refused without previous observation of the girl at such a time. From the physician, Dr. De Castro, who saw one of these attacks and relieved her by the removal of a large mass of pin-worms, I learn that there was no paralysis at all, but "prolonged epileptoid spasms with considerable opisthotonos" leaving her perhaps a little weak.

Hence, although much has been written on this subject, there is as yet no convincing proof that paraplegia, partial or complete, is ever of reflex origin. Certain it is that such cases are exceptional, and that recourse to this explanation is less necessary the more carefully cases are studied. The theory of an hysterical neurosis may in this connection be a real advance—or only a shifting of terms.

B. Parapareses Resulting from Systemic Conditions.

The cases of the other class, to which we now come, though not as widely studied, have a more uniform cause and course. The three types described below are known only in children. To these there may be others that can suitably be added.

5. *From Rickets.*

Attention has recently been called to this form of weakness in the lower extremities by Berg ("Rhachitic Pseudo-paraplegia," *N. Y. Med. Record*, November 16, 1889). He says it has received but little notice from writers on rhachitis. A few quotations will show that it has been fully recognized by American, English, and German observers.

Seitz's *Niemeyer* (edition of 1879, p. 600) says: "Stiebel, most true to nature, tells how the children, who otherwise took the greatest pleasure in moving their limbs or perhaps putting their toes in the mouth, now lie down with their legs stretched out straight and stiff. Apparently, they do not dare to move, they cry out on being turned, and begin to cry when they fear being taken from the bed and carried about." This, of course, refers more to the hyperæsthetic conditions so common in this trouble than to any real paralysis.

Samuel Gee, in *St. Barth. Hosp. Rep.* for 1868 (vol iv. p. 72): "Pseudo-paraplegia—'*Veluti inferiorum artuum paralysis*,' as Stoll says—the rickets falling, as it were, upon the muscles; the bones being left, in some cases, comparatively unaffected. An exaggeration, this, of the inability to stand or walk, which is so commonly met with in rickets. That the muscles are at fault more than the bones is shown by those cases in which, notwithstanding great softening of the bones, the children are able to walk at twelve months of age, and become bandylegged in consequence." This is given by Gee as the first evidence of latent, masked, incomplete, or larvated rickets.

Parry (American Journal of the Medical Sciences, January, 1872, p. 30) treats of this trouble very fully: "In these cases it is not uncommon to find children who had been walking cease making any effort of this kind, and even to become the subjects of 'pseudo-paraplegia.' In no other disease excepting paralysis, it has been said, is the muscular power more interfered with than in this. In scrofula, tuberculosis, and the other cachectic disorders, children may continue to walk with considerable energy even until near the close of life, and when the emaciation and atrophy are far greater." "*Pseudo-paraplegia* (p. 51). There is one form of rickets to which we wish to call especial attention. This is the more important since it is repeatedly mistaken for paralysis, and the helpless infant subjected to a course of medication for disease of the brain or spinal cord. . . . Indeed, it seems as if the disease had expended itself upon the muscles. The common form of this variety is loss of power in the lower extremities. . . . The condition is often unassociated with any serious or even with any visible deformity." In a footnote he tells of an autopsy on a girl of four years: "A typical example of pseudo-paraplegia. The brain, spinal cord, and nerves coming from them were found perfectly healthy, while the muscles of the thigh and leg were wasted and very pale." Berg's article, already mentioned, is so excellent and complete, and fortunately so accessible to all, that further quotation or description is unnecessary. That this affection runs a slow course if untreated was shown by a colored girl of six years, referred to me in August, 1889. The lower extremities showed extreme general weakness—inability to stand alone—though not complete paralysis. Musculature of arms as well as legs very scant, with-

out any localized atrophy. The general evidence of rickets was ample, and a prescription therefor was given. But on looking up the case in April, 1890, it was found that this had been lost, and the child had remained untreated. She was in practically the same condition as eight months previously.

6. *Of Malarial Origin.*

CASE I.—In June, 1886, a boy, Frankie B., was brought to the dispensary for loss of power in the lower extremities and peculiar associated symptoms. He was six years old, and came from the malarious Red Hook. The father, a chronic alcoholic, showed old bilateral wrist-drop, the result of some metallic poisoning. Frankie's trouble was already of three months' duration, though worse "by spells." He likes to lie around, especially on his stomach. Complains of pain in feet and finger-tips. Has a way of pulling off shoes and stockings and holding his feet in his hands; this he would do, if undisturbed, even when brought for examination. Is not inclined to say much even when questioned. Sleeps well. Has lost flesh greatly, though no special atrophy is discoverable. Cervical glands large. Eyelids red. Later he lay down all the time, cried more at night, and then had his worst attacks about 3 A. M., crying and doubling up as his mother said. At the time no cause was discovered (no genital trouble nor helminthiasis), and it was simply called a neuritis. Various lines of treatment proved futile. Many features of the case were so striking and peculiar, however, that the matter was kept in mind with a view to its eventual solution.

In January, 1887, the mother applied for treatment of what was evidently a brow-ague—and this in part suggested the treatment in the subsequent cases.

In March, 1890, it was learned that for a couple of years Frankie had ceased complaining, is well, and uses all his extremities perfectly. He took no medicine; hence recovery was spontaneous, unless influenced by moving to another neighborhood.

Seen again in December, 1890, when he was suffering from a keratitis. Some two years previously he had had a similar trouble of the same right eye. Dr. Lennox, in whose care he has recently been, kindly informs me that it was the ordinary form of keratitis and not in itself characteristic of malaria. Still, as it did not improve, he was then put on quinine and soon relieved. Dr. Lennox considers that the keratitis was without doubt of malarial origin.

CASE II.—German-Irish boy of five years, brought to the dispensary September 17, 1889. Sick all summer. Was at the Seaside Home for a while with asserted malaria. For three weeks now he has been losing the use of his legs; this has become much worse the last two days. He can still walk a little, but soon gets so tired that he has to be carried. He has a slow swinging gait, not simply an excessive waddling but also a laborious dragging. This resembled that sometimes seen during recovery from spinal injuries, where there is simply weakness in the lower extremities with a slight tendency to toe-drop. He likes to sit or drop on his knees. The hands are not stretched out fully, the left one being worse than the right, and appearing like an ulnar paresis (of the type so well shown by Bowlby, *Injuries and Diseases of Nerves*, 1890, Figs.

15 and 16). There was also some undetermined difficulty in speech. He is cross, peevish, and losing flesh. Of late has a bowel movement after each meal, though the evacuation is described as quite natural. Nuchal glands rather large, splenic dulness ditto. Reflexes all normal. A trial was first made with anti-rhachitic treatment, but as this did not affect his condition, and it was found that he lived on the first floor in a very malarial neighborhood—Sackett St., adjacent to Gowanns Canal—quinine with a little arsenic and iron was substituted. In five days he was reported a little better, and in nine more as decidedly improved.

Seen again two months later, when he was almost and perhaps quite free from any motor disturbance, and wholly recovered as to other symptoms. The mother was very enthusiastic over his rapid and full cure, and as later reports are all that he is well, it is certain that he has had no relapse. The anti-malarial treatment had probably lasted about three weeks altogether.

It seems that this boy had been seen also in May, 1888, when the following note was made: "Healthy fellow up to just a week ago, though nervous and old in manner. On that day he came in complaining of pains in his legs, and wanted to be put to bed. Varying since, sometimes he wanted to go about on his knees, again he walks fairly. Comes to the dispensary, walking with knees half bent; can be straightened out without much pain, and in fact the condition seems to be functional (spasmodic) contracture. No knee-jerk. Moans in sleep. Does not eat very well this week. No preputial adhesions. Urinates well. Bladder not full." As both he and his sister had passed intestinal worms, medicine therefore was given. His history up to the next attack given above is not known to me.

Case III.—Samuel W., six years old. Dispensary December 26, 1889. Brothers and sisters said to be weakly; mother dead. Sammy's legs first became weak about a fortnight since. He walks clumsily, with an uncertain waddling gait, much after the manner of the preceding boy, though not quite as badly. Stands with legs apart. He is uneasy; does not sleep well, though he is sleepy mornings and looks sleepy. Eats well, though he cannot swallow solids as well as liquids. A slight disturbance in speech has already improved. Tongue a trifle coated. Face pale and said to show that he is not well. Spleen large. Knee-jerks normal; faradic reactions good. He had lived for three years in one of the most malarious parts of the city. Last October moved to a much healthier neighborhood.

To test treatment he was first put on iron and arsenic. For a week he seemed to improve a little, but then no further. Finally, he was put on quinine with Donovan's solution. He then mended rapidly, and in three weeks was able to walk on the street alone. His gait had become natural. He was no longer inclined to lie down all the time; is lively, active, and does not look sleepy.

March 11, 1890, reported to have kept perfectly well. He has his strong voice again. Goes to school, runs, and plays.

Case IV.—Vigorous boy of three and two-thirds years (mother epileptic). Seen August 7, 1890. Thought not to have been as active in running and playing this summer. For a week especially some loss of appetite, grinding of teeth at night, etc. Since yesterday high fever (over 104°). Constipation. This fever was soon relieved. Next day he went on an excursion, and in the following night awoke complaining of pain in

the legs. This continued on the 9th, with a disinclination to walk. Brought to the office August 10, P.M., in his father's arms. This morning the pain was in the left ankle but now it has shifted to the right, the outer anterior surface in each case. No certain swelling at this spot, but pain on pressing, twisting, or standing; some tenderness of left ankle also. Gentle squeezing of either calf is well borne, but of lower thighs makes him cry. Arms not tender. Will only walk by leaning on something, and even then has to be compelled and at first cries. Now toes-in when walking, though when well walks toes-out. No speech-impediment observed. Very peevish. Sighs now and then deeply. No longer feverish. Spleen a trifle large. Put on quinine and Warburg. For two days more he continued to complain of his legs. On the third morning he came down himself, shouting, "Papa, I can walk!" Since then in good health.

A younger brother (of two years) had a febrile attack believed to be intermittent, and yielding only to anti-malarials some three months later. The mother thought that he also had some difficulty in walking, until the fever was broken, but it might not have been noticed had she not recalled the brother's trouble.

Amongst the asserted nervous complications and sequelæ of malaria are: Neuralgias, including sciatica and cruralgia; limited contractures (Holt, *N. Y. Med. Journ.*, 1883); intra-cranial inflammations of a meningitic type; pigmentary deposits in the brain; epilepsy (Hammond, *Trans. Am. Neurol. Soc.*, 1875, 1 case; Hamilton, *Pepper's System*, vol. v., p. 472, 3 cases);[1] hysteria (Regnault, *Gaz. des Hôp.*, 1890, No. 3, 1 case); mental disorders (Lemoine et Chaumier, *Annales Médico-psychologiques*, 1887, i., pp. 177–209; their fourth conclusion is that "There very probably exists a form of paludal general pseudo-paralysis"); multiple neuritis; and, according to Morton Prince (*Journ. Nerv. and Ment. Dis.*, October, 1889), even tabes and desseminated sclerosis. Vought, in Starr's "Familiar Forms of Nervous Disease," attributes 3 out of 124 cases of chorea to malaria.

Neuritic malarial paraplegia is specially considered by Strachan, of Jamaica (article in *Sajous' Annual*, 1888, vol. i., p. 139); by Singer (one case reported in *Wien. med. Wochenschr.*, 1887, No. 22, pp. 730–1), and by Cardoso Fonte ("Impaludismo larvado; paraplegia complete," *Brazil Med.*, 1888–9). An intermittent form of malarial paraplegia has also been variously observed (*v.* Birdsall, in *Sajous' Annual*, 1889, ii., 110).

Motor disturbance of malarial origin and of the type illustrated by the preceding cases (paraplegic, non-intermittent, though sometimes

[1] Ferreira (*Archivio Italiano di Pediat.*, 1889; *v. Arch. f. Kinderheilk.*, Bd. xii.) "distinguishes four different varieties of the cerebral form (of malaria), which are especially seen in children during the heated seasons, and which are very frequent and very dangerous. These varieties are: 1. The eclamptic form. 2. The comatose form. 3. The delirious form. 4. The meningitic form. The last two are observed more in older children." Earlier cases of malarial epilepsy are quoted in Hanfield Jones's work, 1868.

varying in extent and severity, not severe and protracted but yielding readily to treatment, occurring only in the young) has been fairly recognized by at least one observer (Holt, "The Symptoms and Diagnosis of Malaria in Children," *Am. Journ. Obstet.*, 1883). His remarks on this subject are worth quoting in full:

"Neuralgic pains in the back, the extremities, the neck, and general soreness have all been noted occasionally. The general cutaneous hyperæsthesia is often acute, and, when accompanied by fever, may lead to the diagnosis of some affection of the central nervous system. In the subjoined case the febrile symptoms were slight. It, however, illustrates well the point under consideration."—p. 213.

"CASE I.—Robert M., aged eleven years, was brought to the dispensary May 19, 1882. His mother stated that he had been complaining for several weeks of headache, and of late seemed to be growing stupid. She thought that he was losing his memory. For two days he had been having severe pains in the calves of both legs, of a neuralgic character, and had also complained of the parts being sore to the touch. His limbs were so weak he could scarcely walk a block and a half. A slight fever had been noticed to come on toward evening, but there had been no chill, no sweating, and no vomiting. His axillary temperature was found 101°; he was pale and anæmic; pulse regular; pupils normal. He walked unsteadily, not clearing the floor well with his feet, and seemed inclined to drag the left limb slightly.

"On testing the different muscular groups separately no real paralysis could be discovered, but all the muscles seemed weaker than normal. Over the whole of both lower extremities there was great hyperæsthesia, so that even moderate handling caused him to cry out with pain. This was much more acute in the thighs than in the legs. None was present in the upper extremities. Cinchonidia was ordered, and two days later he reported. There was no hyperæsthesia to be found, and he said the pains were much less severe. He could walk much better than before. Slight fever continued for a few days, and the pains steadily improved, the medicine being kept up. He was not seen after a week from his first visit until November 8th, when he was found walking perfectly well, and said he had no return of the symptoms since I last saw him."

"Motor disturbances are less frequent than the sensory. I have met with three cases in which paresis of the lower extremities was present. In two cases it was associated with severe pain, and improved rapidly under anti-periodics until a perfect cure took place. The third case was not traced; when last seen there was some improvement; some lameness existed."—p. 433.

Two similar cases in children were described by Gibney (*Am. Journ. Neurol. and Psychol.*, 1882, No. 1). They were not intermittent in the same sense as malarial fever, but rather recurred after further exposure to the paludal poison.

It is remarkable that all these patients have been boys, and generally of vigorous rather than puny appearance.

In each of my cases genital irritation, helminthiasis, and vertebral disease were excluded. The possibility of latent rhachitis was considered

but no further evidence of it discovered, and though the symptoms resemble somewhat those at times seen in that trouble, it is fair to conclude that malaria was the prime and predominant if not exclusive cause. Microscopical evidence from examination of the blood is wanting—though in one case, kindly sought for by Dr. Van Cott, of the Hoagland Laboratory—and in such atypical forms of malaria may well prove negative. As to the malarious districts of Brooklyn the Thayer-Baker committee report (*N. Y. Med. Journ.*, May 8, 1886) is not very explicit; but E. D. Page (*Ibid.*, 1887, ii., p. 566) briefly says that, "Usually, these cases (of malaria in children) can be traced to those districts skirting the bay or in the vicinity of Gowanns Canal, regions known to abound in malaria." The first three of the above cases came from the worst parts of this neighborhood.

The symptoms are few. Apparently there is a general motor weakness of both lower extremities, without special atrophy or change in reactions, reflexes, or local circulation. The main complaint for which they are brought is that their legs have become very weak or paralyzed. The children have been too young and uncommunicative to say whether it was tenderness and pain that interfered with their walking. They object to making any attempts, and when stood up remain where placed with feet somewhat apart, or make clumsy attempts at progress and drop down helpless. In one of these and in one of Holt's cases the thighs were found to be more tender than the calves, though some general oversensitiveness to touch and pressure may exist.

The children are ill-humored and fretful. They are not, however, as timid and inclined to cry as choreics, though a slight early speech trouble—more a disinclination to speak than any distinct defect—might lead one to think of chorea. This, as also Morini's recent case, corroborates Singer's observation that aphasic affections are common in disorders of the nervous system due to malaria. This, with the arm trouble in one case and slight impediment to swallowing in another, indicates a more than local implication of the nervous system. The variable pains in the extremities are also frequent in children suffering from other forms of malaria.

Little value attaches to any enlargement of the spleen, since this occurs also in rickets. There is a marked difference between the favorite attitude of these patients—as also of those from rickets—and that attributed to paraplegia from genital reflex or spina bifida. In the latter there is frequent mention of a tendency to adduction of the thighs, whilst in the former quite the opposite prevails.

The distinction of malarial from rhachitic paraplegia may not be as easy, and, in the absence on the one hand of febrile attacks, past or present, on the other of distinctive rhachitic marks, one has to depend partly on determining which etiological factor is more probably present, or on therapeutic experiment.

7. *In Chorea (Rheumatic?).*

In this disorder there are two distinct forms of paralysis that do not appear, however, to have been very carefully distinguished. Only one of these, the first below, belongs to the clinical forms under discussion.

(*a*) True choreic paralysis usually incomplete. This commonly appears either very early in chorea or else at the beginning of convalescence, A paralysis varying from partial to very pronounced may usher in the more characteristic phases of chorea. The child is brought by the anxious parent with this complaint alone. Inquiry shows that though it may have developed rapidly its onset was not strictly sudden. Such cases are far more misleading than where the trouble follows a typical chorea. Though this form is usually unilateral (monoplegic or hemiplegic), in rare cases a paraplegic or paraparetic type, or a condition like general motor exhaustion occurs. However, the mono- and hemipareses in the prejactatory stage of chorea, not infrequent in any large nerve clinic, sufficiently attest the fact that motor impairment may be due to the choreic process alone; and they further indicate that the general paralytic condition, seen in or following many cases of chorea, is not wholly due to the tiring of the nerve motor apparatus.

Souza-Leite and E. Cherbuliez (*Progrès Med.*, 1889, No. 19) have published two observations on girls—or really young women—with neuropathic family history, in whom for a time there was paresis of both lower extremities (arsenic as a factor excluded). They also quote a corresponding case from Ollive's thesis. The choreic paralyses, including paraplegia without marked jactation, are also fully considered by Cadet de Gassicourt (*Rev. mens. d. Mal. de l'Enf.*, 1889; seen only in abstract).

Paralysis during or after the characteristic period of chorea will rarely be misconstrued. In early and doubtful cases something in the mental condition of the child, a greater impairment of one side, an occasional choreic twitch, or a history of past chorea, usually gives a clue to their real nature.

(*b*) Neuritis (arsenical or rheumatic) following chorea. This is a far more frequent cause of paraplegia than chorea alone.

Sherwell (*Brooklyn Med. Journ.*, April, 1890, p. 273) has added a recent case to others by Brouardel and Pouchet. Railton's case of paralysis following chorea is attributed by others (*v. Sajous' Annual*, 1888) to arsenic; and the same possibility is suggested in Fry's case ("Chorea with Multiple Neuritis," *Journ. Nerv. and Ment. Dis.*, June, 1890). Several other cases have been published. In fact there has been some question whether the cases attributed to chorea were not in reality all due to arsenic. But such is certainly not the case. In Ashby's case (*Manchester Med. Chron.*, 1890), occuring in the course of a choreic

attack, both arms and legs were affected; the sensitive contractures, atrophy, etc., indicate that it was a neuritis, evidently rheumatic.

Do these cases of the second class (B) represent the initial or slightly developed stage of severer trouble, or, are they always self-limited? As to the malarial group, one of the above cases, as well as one of different character given by Holt, indicates that spontaneous recovery may be expected; and the same holds for the rhachitic and choreic forms. There is evidently no gross pathological basis, as these cases do not in themselves present any proof thereof, and under suitable management recover so rapidly. The paresis may be the immediate effect of toxic matters in the circulation; or it may be a pseudo form, the consequence of muscular and fascial tenderness; according to prevailing views, however, some mild form of neuritis seems most probable, though, as is the case in common pressure paralysis, the change may be too slight to be demonstrable.

However, it is quite possible that the seat and nature of the trouble may be very different in the different forms. That the condition in each seems to favor the development of poly-neuritis is indicated by various cases, some of which are mentioned in this paper.

8. *Other Forms of Paralysis to be Distinguished from the Preceding.*

(*a*) The possibility of confounding any of these cases with infantile spinal paralysis or that following meningitis, especially cerebro-spinal, is slight; but certain other motor disturbances in childhood are at times confusing.

(*b*) The nearest analogy is furnished by certain forms of neuritis. That malaria in children, usually after a more typical course, may induce undoubted neuritis with resulting atrophies in both upper and lower extremities was made probable by two cases observed late in their course. Both were in boys, one of five, the other of seven and two-third years. The trouble followed intermittent febrile attacks without the intervention of any such condition as that in the previous cases.

(*c*) Another form of neuritis occurring in children is that, now so well recognized, from arsenic. Various recent writers note that at least in adults diabetic neuritis preferably attacks the lower extremities, and is more often bilateral. Alcohol, lead, and the rest of the category of neurotoxics might doubtless be included as possible analogous causes of paraplegic phenomena in the young.

(*d*) The post-infectious paralyses (after diphtheria, scarlatina, measles, etc.) are sufficiently common. At present they are largely classed as cases of neuritis. That following diphtheria is familiar to all, and probably that after scarlet fever is essentially similar. A form of extensive and for a time severe (complete) paralysis after measles has been described (principally by French writers within the last decade), and "a certain tendency to simple paraplegia" noted. According to the

two cases seen by the writer—one, a girl of six years, at the dispensary in the spring of 1885; the other, a boy of two years, in the practice of Dr. McNaughton—this form is somewhat distinctive in character. At first all the voluntary muscles below the head, except the respiratory, were involved. Improvement began in a few weeks, and went on to entire recovery in from one to two years.

(*e*) Hysterical cases of this type must be very rare in American children at least. S. P. Denhope (*Cincinnati Med. Journ*, Nov., 1890, p. 366-9) gives a case of hysterical paraplegia in a German girl of twelve years.

(*f*) Incipient paraplegia from Pott's disease should be carefully excluded.

(*g*) Syphilitic or osteo-chondritic pseudo-paralysis, often called Parrot's disease, is apt to attack but one extremity, whether a lower or an upper, at a time. It has been described in this country by Van Harlingen and others.

(*h*) Infantile spastic paraplegia (of Osler, Fergusson, and others) cerebral in origin.

It is certainly of the greatest moment, for practitioner and patient, to recognize the difference between the essentially functional and the tedious organic paralyses of childhood. Though relatively rare, these lighter forms are nevertheless worthy of further study and fuller recognition. Treatment follows from the diagnosis; and the prognosis also, usually excellent, depends on the primary trouble.

THE DIAGNOSIS OF POTT'S DISEASE.[1]

By Robert W. Lovett, M.D.,
of Boston.

In considering the question of the diagnosis of Pott's disease, one must start with the assumption that the *history* is of little or no value in establishing the presence of the disease. It may be significant enough to make one suspect very strongly the existence of vertebral disease; but without definite physical signs, it can never be positive enough to justify the diagnosis of Pott's disease. With this understanding, it may be asserted that particularly significant symptoms are paroxysmal pain in the chest or abdomen, which is aggravated by jarring or movement; and pain coming on at night when the child is first falling to sleep (sig-

[1] Read by title before the American Orthopædic Association at Washington, September 23, 1891.

nificant as the well-known night-cries, simulating very closely those of hip disease). Other symptoms which should excite suspicion are: tiring easily, leaning on tables and chairs, carrying the chin in the hand, and supporting the weight of the trunk by placing the hands upon the knees. These symptoms should all be considered significant and suggestive, but it may be said once more that they cannot be considered, in the absence of physical signs, as establishing the diagnosis of Pott's disease. Such a history should be allowed especial significance when it occurs in the children of tuberculous parents, or when it follows some months after the exanthemata, or comes on as the remote result of a fall which has injured the spine. It should be mentioned that the absence of pain can in no way be assumed to show the absence of Pott's disease.

The diagnosis, then, must be made wholly from the *physical examination*, and the chief physical signs upon which one must rely can be divided into two classes: (*a*) those occurring from bony destruction, and (*b*) those dependent upon muscular spasm.

(*a*) *Signs Due to Bony Destruction.*

Since these are made evident by the presence of angular deformity of the spine, which is the result of bony destruction, they are so conspicuous that they can scarcely be overlooked. And the prominence of one or more of the vertebral bodies, associated with muscular spasm, is a positive sign of the presence of the disease, unless it is the result of a fracture of the spine, or in adults the outcome of malignant disease. In the larger number of cases, as they come to the surgeon, this bony deformity has occurred, and the diagnosis can be made at a glance; but the most important class of cases, so far as the diagnosis is concerned, are those where bony destruction has not yet begun, and where the need of an early diagnosis is evident, in the hope that it may lead to treatment which may be sufficient to prevent the occurrence of deformity.

(*b*) *Signs Arising from Muscular Spasm.*

These are:

1. Stiffness of the spine in walking and in passive manipulation.
2. Peculiarity of gait and attitudes assumed, according to the location of the disease.
3. Lateral deviation of the spine.
4. High temperature.

Of the two latter it may be said that they do not receive general recognition as diagnostic symptoms, hence the writer feels inclined particularly to call attention to their importance.

Lateral[1] deviation of the spine he believes to be practically a universal

[1] R. W. Lovett: Boston Med. and Surg. Journal, October 9, 1890.

sign in Pott's disease,[1] and high temperature as a constant accompaniment of active tuberculous joint disease has been already discussed at length. Further experience has only served to confirm, in his opinion, the value of these two signs.

1. Muscular Stiffness.—On examining for muscular stiffness of the spine, the child is most conveniently laid face downward on a table or bed, and lifted by the feet. In a normal back the lumbar spine can be markedly flexed, and a general mobility is seen of the whole column. In patients where Pott's disease is present the region affected is held rigidly by muscular contraction when manipulation is attempted. In certain instances the erector spinæ muscles stand out like cords when the child is lifted, and it is questionable how much importance should be attributed to this sign. After having depended much upon it, the writer has come to the belief that it is not a sign of Pott's disease, and that it occurs in cases of hip disease, and in certain instances in excitable children where no joint disease is present. Lifting the patient by the feet in this way is practically sure to show the existence of lumbar or lower dorsal rigidity; but it does not detect high dorsal Pott's disease. In lumbar Pott's disease lateral mobility of the spine, as well as antero-posterior flexibility, is lost.

2. Peculiar Gait and Attitudes.—In considering the gait as a diagnostic symptom of Pott's disease, one must be prepared to find any or all the characteristic features absent. In general the walk is careful, steady, and military, and the steps taken with such care that jars to the spine are avoided; in other instances, however, the child walks with comparative freedom, even when the presence of the disease is manifest, and the well-known test of having the child pick up objects from the floor may fail to detect anything. It is only necessary to allude to the fact that these symptoms, usually assumed as characteristic, may be practically absent in clearly marked cases of Pott's disease.

Assuming, then, the extreme importance of the early diagnosis of the disease where practicable, it becomes necessary to consider in detail the general and local physical signs, according to the region of the spine affected.

Cervical Pott's Disease.—The most common symptom of the disease in this region, due to muscular rigidity, is the occurrence of wry-neck with stiffness of the muscles of the back and neck. This is often accompanied by distressed breathing at night, and intense occipital neuralgia. The head is held sometimes in a very much distorted position, and the most characteristic attitude is when the chin is supported in the hand; and when the patient turns sideways to look at objects, the whole body is turned. In severe cases one notices flattening of the back of the neck,

[1] Ibid., April 17, 1890.

with sometimes bony deformity. When spinal caries occurs in this region the early symptoms are most often confused with sprains, muscular torticollis, and inflammation of the cervical lymphatic glands.

From sprains the diagnosis is almost impossible. In the early stages of sprains of the neck the head is often held stiffly and to one side; motion is resisted and is painful, muscular spasm is present, and in the case of children of unintelligent parents the history cannot be accepted as valid. The writer has in mind a case which presented every symptom of Pott's disease in this region, where two weeks in bed cured all the symptoms, and the recovery has been permanent.

From true muscular wry-neck the diagnosis is often extremely difficult. In true torticollis manipulation is generally not painful, and one muscle is firmly contracted while the rest are relaxed. In congenital cases the head and face are distorted, and the eyes often are not upon the same plane. In Pott's disease, on the other hand, the muscular fixation involves all the muscles, and movement in any direction is resisted. It is more apt to be painful, and in most cases comes on with considerable rapidity. This applies fairly well to cases of anterior wry-neck; but in cases where the true muscular torticollis is of the posterior variety, and is due to a contraction of the deeper muscles, the diagnosis is much more difficult, for no one muscle is contracted, and movement is limited by a general muscular resistance. The writer has in mind certain cases where the diagnosis has been impossible, and some in which an operation of tenotomy has been performed in cases of Pott's disease where a most careful examination had seemed to establish the diagnosis of true muscular wry-neck.

In these obscure cases the differential diagnosis is extremely difficult, and can be most easily made by putting the patient to bed and seeing if the application of the extension is sufficient to overcome the distortion, as it will do in the course of a few days if due to Pott's disease. It is in this class of cases that the writer would particularly insist upon the value of high temperature as pointing to the presence of Pott's disease.

Inflammation of the lymphatic glands of the neck is likely to give rise to a position of the head simulating wry-neck, associated with muscular spasm. These cases simulate Pott's disease very closely, and in two cases under the writer's observation recently the diagnosis has been impossible until the inflammation of the glands was subdued, and it was found that the head again became perfectly movable. In these cases it was impossible to determine whether the inflammation of the glands was secondary to the Pott's disease, or the muscular spasm was the result of the adenitis.

Upper Dorsal Pott's Disease.—In this region detection is the most easy because any bony destruction at once results in angular deformity, on account of the posterior curve of the spine in this part, and it is on this

deformity that one must depend rather than on symptoms due to muscular stiffness.

The shoulders are, however, held high and squarely, the gait is military and careful, and lateral deviation is almost certainly present. In dorsal Pott's disease, paralysis may exceptionally be the first perceptible symptom.

The two affections with which dorsal Pott's disease is most likely to be confused are scoliosis and round shoulders. From rotary lateral curvature the distinction may be difficult in cases where the kyphosis is rounded and involves several vertebræ. The fact that lateral deviation of the spine is so constantly associated with Pott's disease is another factor in making the distinction more difficult.

In a case recently under the care of Dr. Bradford and the writer, for some weeks it was impossible to make a diagnosis between scoliosis and vertebral disease, in the case of a girl twelve years of age, and it must come to the mind of everyone under whose observation these cases come that there are certain cases where a distinction between the two is extremely difficult. As a rule, this is in very early cases, but in the case just alluded to the disease had been in progress for many years.

Here, again, the writer would call attention to the importance of high temperature as pointing to the presence of Pott's disease.

From round shoulders, Pott's disease is generally to be distinguished by the fact that in the former the spine is flexible, and the deformity rounded and not angular. In some cases of round shoulders, however, where the affection is of long standing, the curvature is more or less fixed, and pain may also be present, so that the resemblance to Pott's disease is marked; but these cases are uncommon, and the distinction is generally easily made.

Lumbar Pott's Disease.—Vertebral caries in this region of the spine is difficult of detection on account of the anterior curve of the spine in the lumbar region, so that in any moderate amount of destruction of the lumbar vertebral bodies no posterior angular curvature is developed, and it is only in the later stages of the disease that any angularity becomes prominent. The occurrence of deformity is preceded by a flattening of the lumbar curve, which is characteristic and very significant. The attitude is that of lordosis, which in some cases becomes very marked; the gait is military and careful, and lateral deviation is always present, sometimes to a very marked degree. It is in this region of the spine that it is most conspicuous.

In using the ordinary tests to detect the disease in this region one is liable to be deceived by the readiness with which some children can bend the spine in picking up objects from the ground when lumbar Pott's disease is markedly present. This is due to an increased flexibility of the upper part of the spine. In many instances of lumbar Pott's

disease the first noticeable symptom is a limp which is due to unilateral psoas contraction, the result perhaps of abscess, or perhaps only of psoas irritability, and psoas contraction must be set down as one of the common symptoms of lumbar Pott's disease. If the child is laid on its face and an attempt is made to flex the lumbar spine, it is found to be entirely rigid, and any attempt to hyperextend the leg in this position leads to the detection of the slightest psoas irritability.

Lumbar Pott's disease is most liable to be confused with single or double hip disease, with rhachitic curvature of the spine, and with primary inflammation of the psoas muscle.

The differential diagnosis between lumbar Pott's disease and hip disease is one which the writer often finds extremely difficult, although it is not generally considered so; but a long series of mistakes made by other surgeons, as well as by himself, have led him to consider the diagnosis as one which should be made with very great care. In general, when the hip symptoms are due to Pott's disease, and the joint symptoms are caused by psoas irritability, the restriction of motion in the hip is simply in the loss of hyperextension; while abduction and internal rotation are free and not affected. This limitation of motion in only one direction is generally sufficient, in connection with the other symptoms, to establish the presence of Pott's disease. On the other hand, in some cases the limitation of the hip's motion is in all directions, and simulates very closely the limitation of true hip disease.

In a case of lumbar Pott's disease, which had been for some years under the writer's observation, suddenly a complete limitation of all the motions of the right hip occurred, and it seemed as if hip disease must be present. The child was kept quiet, and in the course of a few weeks the symptoms entirely disappeared, leaving the hip perfectly well, and in the whole time there never was any evidence of psoas abscess. The child in the last two years has been free from all hip symptoms. This case simply serves as a type of several which have occurred under the writer's observation where psoas irritability very closely simulated true hip disease.

Another element which leads to the confusion of the two affections is the rigidity of the lumbar spine which often occurs as an accompaniment of acute hip disease. If a child with hip disease is laid upon its face, and an attempt made to flex the lumbar spine by lifting the feet from the table, the irritability of all the muscles is so great that often the lumbar spine will appear to be completely rigid, and only a very careful examination will show that this is secondary to the hip disease.

Rhachitic deformity of the spine is a posterior curvature often so sharp as to be angular. It occurs at the junction of the dorsal and the lumbar regions. This junction is also the most frequent site of Pott's disease.

Rhachitic curvature of the spine is characterized not so much by muscular spasm as by persistent stiffness in most cases, so that if the child is laid upon its face, and an attempt is made to flex the spine, the curve is not obliterated. The symptoms, therefore, are the same that would be presented by Pott's disease occurring under the same conditions, and much dependence must be placed upon the coexistence of rickets.

In general, a posterior curvature of the spine in young children is much more apt to be rhachitic, but it may simulate Pott's disease so closely that a diagnosis is impossible. It has been the writer's custom to treat all such cases by rest in bed or on a frame, with the experience that in nearly every instance where the general signs of rickets were present, complete mobility was restored to the back within the course of a few months.

Primary inflammation of the psoas muscle would simulate lumbar Pott's disease, accompanied by psoas abscess, so closely that a distinction between the two might be difficult. There would, however, be no symptoms of flattening of the lumbar curve of the spine. There would probably be, however, some stiffness of the lumbar spine in making the ordinary tests, and lordosis would be present to a certain extent. Primary inflammation of the muscle, however, is very rare, and its existence should lead to the suspicion of Pott's disease, and the only distinction that could be made would be the absence of bony change, and a greater flexibility of the lumbar spine where only the muscle was involved. In most cases, however, it would be safer to assume that lumbar Pott's disease was present, and fortunately the treatment of the two affections would be identical.

Pain. A word should be said with regard to the significance of pain as a diagnostic symptom in Pott's disease. In most cases it is referred to the terminal part of the spinal nerves, and the pain is most often complained of in the front of the chest, and in the abdomen, where it often passes for stomach-ache. In other instances severe pain is felt in the legs where the disease is low down, and in cervical disease it takes the form often of a severe occipital neuralgia; but the absence of pain, as has been said, is not to be taken as evidence of the absence of the disease. Pott's disease is in general more often accompanied by pain than hip disease, for example; but, on the other hand, certain cases pass from the earliest to the latest stages with little or no pain, and the former diagnostic tests of lifting the child suddenly, making pressure upon the head and the like, can be set down as not only harmful, but entirely useless.

The same may be said with regard to tenderness over the spine, which is often assumed to be a diagnostic symptom. It is in most cases absent, and if it is present it shows nothing, and is of no diagnostic importance

whatever. On the other hand, the occurrence of persistent abdominal or chest pain in a child is a symptom which should be allowed more weight than it ordinarily receives in the hands of the family physician, and although it is in no way a diagnostic symptom of Pott's disease, yet it is so often due to that affection that its presence should lead to a very careful examination to detect, if possible, the early stages of the disease.

3. Lateral Deviation of the Spine.—The writer believes that a noticeable amount of lateral deviation of the spine is an early symptom of the existence of Pott's disease, and occurs in practically all cases of dorsal or lumbar disease. It is a symptom due to muscular spasm, and is early rectified by treatment. In cervical disease it is often present, although it cannot be set down as a uniform accompaniment of the disease in this situation.

4. High Temperature.—In a large series of observations relating to Pott's disease in the acute stages it has been the writer's experience that a high evening temperature is almost uniformly present, and that it occurs independently of abscess formation, and is no higher in cases of abscess than in cases without abscess. The rise of temperature is from one to three degrees, and in general it can be accepted as indicating roughly the degree of severity of the disease.

The Diagnosis of Abscess.—The diagnosis of abscess in Pott's disease rarely presents any difficulty, but in certain instances their occurrence is attended with peculiar symptoms which may give rise to some obscurity. In the cervical region the most common seat of abscess formation is in the back wall of the pharynx, where it often persists for some time unrecognized, giving rise to a peculiar series of respiratory symptoms. The pharyngeal wall is pushed forward, and the child breathes at night with a peculiar snoring respiration, which is to a certain extent characteristic. There is some difficulty in swallowing food; the pain is apt to be severe; and occasionally a swelling extends so much to the side as to be noticeable at the sides of the neck. The finger introduced into the mouth comes upon a projecting swelling of the back of the pharynx, which is characteristic and not to be mistaken.

In the dorsal and lumbar region the abscesses point for the most part in the loin, or follow down the course of the psoas muscle to appear in the upper part of the thigh or groin. Appearing in the back the abscess is not likely to be mistaken for anything unless for a cellular abscess of the back muscles, which is not an uncommon occurrence in young children.

Appearing in the groin the abscess may be mistaken for hernia which it sometimes resembles rather closely, and gives a certain obscure impulse on coughing; but it is irreducible and the part of the psoas muscle within the abdomen can be felt to be enlarged and resistant. Psoas contraction is present, which causes flexion of the leg. Psoas abscess

due to Pott's disease cannot be distinguished from psoas abscess due to other causes except by the presence or absence of the diagnostic signs of Pott's disease.

The Diagnosis of Paralysis.—Paralysis in Pott's disease, although ordinarily one of the later symptoms, may occasionally precede the deformity, and be the first sign of the presence of vertebral disease. Such cases are not so rare that they should be overlooked. The occurrence of myelitis in a young child should be considered as extremely suspicious, and as being more likely to be due to Pott's disease than to any other cause, even if the signs of vertebral disease are obscure or apparently absent. In general the paralysis is preceded by a stage of the disease in which this pain is much increased, and this pain may be paroxysmal or steady.

The first thing noted generally in the paralysis is a tendency to tire easily, and to hit the toes in walking. A disability to use the legs much and a staggering gait follow this very closely, and along with it is often a jerking and twitching of the legs at night, with an occasional cramp of the muscles. When such paralysis occurs in connection with disease of the cervical and dorsal regions, the patella reflexes are much increased and ankle clonus is present to a marked degree. In disease of the lumbar region, however, the pressure may be upon the cord below the reflex centres of the cord, and the patella reflex may be absent as well as the ankle clonus. The paralysis is generally one of motion only, but in severer cases sensation is impaired or lost. The paralysis may be either a slight disability or a complete loss of power, and its general diagnostic symptoms are those of myelitis.

A CASE OF PEMPHIGUS FOLIACEUS ENDING FATALLY WITHIN EIGHT MONTHS.

By Hermann G. Klotz, M.D.,
of New York.

The history of the following case of pemphigus chronicus vulgaris, turning into pemphigus foliaceus and ending fatally within about eight months, has been taken from my notes, principally at the suggestion of my friend, Dr. J. W. Gleitsmann, Professor of Laryngology in the New York Polyclinic, on account of its bearing on the incidental affections of the oral cavity and the larynx. Dr. Gleitsmann having abandoned the idea of writing a paper on the subject, the case, I believe, is of interest enough in itself to justify its publication, since only very few cases of pemphigus foliaceus have been recorded in this country, those of Dr. Sherwell, of Brooklyn, and of Dr. Graham, of Toronto, Canada, men-

tioned by Duhring, being the only ones I could find after a careful search of the *Index Medicus*. Besides, interest in the case will be somewhat increased by the fact that recently the pathology of pemphigus was brought into greater prominence by the discussion of the subject before the late meeting at Vienna of the German Congress for Internal Medicine, in connection with a report by Mosler, of Greifswald, in which the participation of the mucous membranes formed an important part. The present case has been briefly mentioned by Dr. L. D. Bulkley in a paper published recently.[1]

Mr. F. T., cigar manufacturer; a native of Germany; forty-nine years of age, with a good family record; married, and father of six healthy children. Was first seen by me at my office on May 7, 1887. A man of strong physique, he had generally enjoyed good health; he at one time was a member of the police force of this city; he never had syphilis; in 1876 he had pneumonia, and, somewhat later, trouble with the left tonsil, which he subsequently had removed. In December, 1886, he contracted a severe cold at the inauguration of the Montefiore Home, and on another occasion soon afterward had his feet thoroughly chilled. Within a short time he began to suffer with bronchitis. In January, 1887, he noticed a blister on the left breast, and soon after blisters in the mouth, particularly on the gums, which caused a great deal of annoyance, especially during eating and otherwise. He consulted several specialists for mouth and throat diseases, without relief. It appears that the lesions in the oral cavity were considered as specific, and were treated accordingly. I saw the patient first in consultation with his family physician, Dr. J. Scheider, and with Dr. Gleitsmann, because the latter had some doubt as to the nature of the lesions of the skin as well as of the mouth.

On inspection of the oral cavity the gums, from the edge about halfway to their base, appeared devoid of epithelium, leaving a dark-red, nearly cherry-colored surface, with intervening yellow spots here and there. The mucous membrane of the cheeks, of the uvula, and of the soft palate showed the same loss of the epithelial cover, forming irregular and variously outlined dark-red patches, partly covered with yellowish membranes resembling mild diphtheritic exudations. Between the upper and lower maxillæ this condition was particularly severe, shallow fissures of a deep-red color appearing on the generally yellowish surface. On the upper surface of the tongue, as well as on the lower one, numerous dark-red raw spots were likewise noticed.

On the scalp, which, particularly in the front parts, was but thinly covered with dark-brown hair, a number of bullæ of different sizes, more or less tensely distended with a clear, watery fluid, were observed; the largest one, about the size of a fifty-cent piece and rather flat, was located just within the hair, several smaller ones over the vertex, and some on the forehead. Beside these blebs a number of pale reddish spots could be noticed on the face and scalp, some of them quite smooth, some covered with thin scales resembling gold-beater's skin. On the right aspect of the neck a number of similar bullæ were found, one behind the left

[1] New York Med. Journal, 1889, i., No. 15: "On the Value of Frequently Repeated Doses of Arsenic in Treatment of Bullous Diseases of the Skin, etc."

ear covered with a blackish crust owing to the application of nitrate of silver, and further down on the same side a larger cluster of smaller bullæ or vesicles containing a perfectly clear fluid.

Quite a number of similar bullæ and scaly or smooth spots were scattered over nearly the entire front and back of the thorax without forming distinct groups, while on the abdomen only a few blisters could be observed, besides numerous reddish spots, which, according to the patient's observation, mark the first stage in the development of blisters. The bullæ vary in size from a hemp-seed to a small filbert; the more recent ones are all hemispherical and tensely distended, while some of the older ones are flaccid and overlap their bases like a bag. The contents of the blebs were in almost all cases perfectly clear, only in the dependent portions of some of the older ones a somewhat opaque or even pus-colored fluid could be observed. Close to the frenulum glandis penis two small excoriated depressions of a remarkably dark-red color, resembling that of raw smoked beef, were found; on no other part of the body, particularly not on the extremities, could blisters or scars or other pathological changes be detected; the lymphatic ganglia were nowhere enlarged or otherwise affected.

On the strength of these symptoms, in connection with the condition of the mouth, and with the history of their development, the diagnosis of pemphigus chronicus vulgaris was made. The patient was ordered to take arsenic and iron (Fowler's solution with the tinctura ferri pomati, 1 part to 12; 20 to 30 drops three times a day); locally, baths and a dusting powder composed of bismuth, zinc, and starch were given. Considering the comparatively small extent of the disease after a duration of over three months, it could be regarded as of a mild type. Up to May 11th very few new blebs had made their appearance, except in both axillæ, where clusters of smaller bullæ were visible, some containing a transparent fluid of a light-yellow color; others were dried up into a yellowish crust. The maculæ on the abdomen had entirely disappeared.

May 17th. No new blebs were found; almost all the former ones had dried up, leaving brownish spots, some of them scaly. Even the axillary eruption showed great improvement, but the excoriations on the penis had not undergone any change. The dose of the medicine had been increased to 40 drops without any trouble, except slight costiveness.

25th. While only a few new bullæ have broken out on the body, numerous clusters of smaller ones have developed between the toes and on the soles of both feet, while the large one on the scalp, as well as another quite conspicuous one over the right clavicle, have entirely dried up. The nail of the right thumb shows a brownish color, suggesting the formation of a blister beneath that had rapidly dried up again. The patient's general health is fair; he has retained the weight of one hundred and seventy-two pounds to which he had previously fallen.

June 1st. A few new bullæ on the right arm and the thorax have appeared, but quite numerous ones beneath and between the toes which are very annoying on account of itching and of the offensive smell of the easily decomposing contents. After removing the cuticula as far as possible with a pair of curved scissors, the parts were cleansed with a solution of boric acid, dusted with bismuth, and covered with borated cotton.

In this way the disease continued, taking a still comparatively mild

course, up to June 20th; although constantly new blisters formed, some of them in groups, still they had the tendency of drying up rapidly and to leave the skin but little impaired, except as to its color, which was changed into a reddish-brown. From that date on, however, it assumed a different character. Not only did the isolated bullæ all over the trunk become more numerous, but also, first on the right forearm and very soon afterward on the left one, more flaccid bullæ appeared in great numbers; they extended within a few days from the shoulders to the wrists and to the backs of the hands, and soon began to run together, detaching the epidermis over a considerable space in the centre and leaving a denuded, bright-red, shining or glazed surface, as in eczema rubrum, or that beneath the blisters of a burn of the second degree. Although in the central portions of such patches new epidermis was formed, it never became solid and firm again, but remained brittle, divided by superficial fissures, or slightly scaling. In the peripheral portions, particularly around the wrists, the bullæ lost their sharply defined form and the epidermis was raised in a continuous outline, clearly exhibiting the character of pemphigus foliaceus.

After June 20th the patient was unable to dress, and had to stay at home. Arsenic, the dose of which had heretofore been gradually increased, was now omitted, owing to loss of appetite and dyspeptic symptoms, and 5 grains of the muriate of quinine were given every three hours. Local baths were applied to the arms; but on the 22d the eruption of bullæ became so general all over the trunk that the patient was ordered to stay in the bath-tub as continually as possible at a temperature of 80° to 85°. This he did from that date with little interruption up to August 1st, generally repairing into the bath-tub at 5 or 6 o'clock A.M., and remaining there as late as 9 P.M., taking all his meals while there. The warm weather prevailing throughout July, 1887, favored the use of a bath as continuously as circumstances would permit. During the night lotions or powders were applied, and the compound salicylated soap plaster which I have devised[1] was used on the larger raw patches with good effect.

A slight remission followed this first stormy eruption, lasting, however, but a few days. The bullæ now numbered by hundreds, and new ones were constantly added, while the old ones rapidly dried up and even the denuded surfaces showed considerable improvement. Except a feeling of weakness the general condition of the patient was fair, appetite good, bowels regular; sleep at night was not very quiet, but the patient had a number of naps during the day. The urine at this time and through the entire course of the disease never showed any irregularities; it was voided, without any trouble, in normal quantities, was generally of a light-yellow color, and never showed the presence of albumin or sugar.

A new feature manifested itself after June 27th. Heretofore all the new blebs appeared on skin of normal condition (except on the arms, where it was considerably swollen and red during the intense eruption), and had caused but slight burning or itching preceding the eruption. On the above date it was noticed that some of the bullæ on the trunk rose on top of a wheal-like, reddish elevation, accompanied by considerable itching. On the next day numerous slightly elevated patches of a

[1] New York Med. Journal, Sept. 17, 1887.

dusky-red color were observed on the lower part of the trunk, extending nearly symmetrically to the thighs, varying in size from a silver half-dollar to a dollar. Over these patches numerous small blisters with perfectly clear contents could be observed, principally studding the borders of the patches, most of them yet half-hidden in the skin, causing intense itching before and after eruption. This condition answered very well to the description of pemphigus pruriginosus given by Kaposi.

While the general condition of the patient remained satisfactory, on June 30th it was noticed that for the first time bullæ appeared on parts previously unaffected; on the back and abdomen several blisters attained the size of a walnut, raised more than half an inch above the surface of the skin. On July 1st the patient was seen in consultation by Dr. George H. Fox, who proposed mainly a change of diet to a more vegetable and less stimulating one.

It is no longer necessary to follow so closely the course of the disease. During the first part of the month of July there followed a general improvement. Still, new blisters were forming constantly and on some localities large areas denuded of epidermis could always be found, while in certain portions, particularly around the joints—above all, about the wrists—the foliaceous character never entirely disappeared. The patches, resembling urticaria, gradually flattened down and coalesced, forming extensive areas of a dark, bluish-red color, which, at first beginning only around the borders, soon changed into a brighter, almost scarlet, tint, and presented its former deep hue only after the patient had assumed an upright position for some time. The groups of smaller vesicles, often half-hidden in the skin, with their intense itching, continued to appear beside the isolated larger bullæ arising from the uninfiltrated skin. After July 6th the quinine was omitted and 10 grains of salicylate of soda were given every three hours. This drug seemed to have a beneficial effect on the itching and on the formation of the smaller blisters, but the general condition was not much altered; therefore, on the 17th Fowler's solution was again resorted to, increasing from 2 to 5 drops three times a day.

About July 19th an extensive eruption over the buttocks obliged the patient to relinquish the bath-tub for several days, as the pressure on these parts became unbearable; but he soon returned to the bath, as apparently he found more comfort in the water than in the bed. About the same time the affection of the mouth and lips, which so far had continued in a moderate degree, began to cause intense suffering, and obliged the patient to avoid solid food almost entirely. Dr. D. L. Bulkley, who saw the patient for the first time on July 26th, recommended a more effective administration of arsenic, which now was tried in the form of the solution of sodium arsenatis, 2 to 10 drops every two hours.

A short period of improvement set in again about August 1, although the formation of new blisters did not cease entirely, and several portions remained at all times severely affected; in general the tendency to form a new epidermis decidedly prevailed over that of destruction. The affection of the mucous membrane of the mouth and its adnexa, however, remained exacerbated, and considerably annoyed the patient by the discharge of a copious serous secretion, which originated either in the pharynx or the œsophagus or the trachea or the larger bronchi.

Heretofore the temperature had always remained normal and the pulse seldom exceeded 72. On the evening of August 5th Dr. Scheider,

who continuously attended Mr. T., found the temperature at 101°, pulse 120, with frequent respiration, and the patient in a state of great weakness. The next day at noon, with a temperature of 102°, pulse 112, respiration 30, he was very low and weak, continuously expectorating large quantities of a sero-purulent fluid from the throat. The symptoms suggested congestion of the lungs or beginning pneumonia, of which, however, no physical signs could be detected by careful examination. Under the administration of valerian with the carbonate of ammonia and stimulants, the temperature remained between 101° and 100.5°, the pulse about 96, the respiration somewhat more frequent than normally for the next three days. After August 10th the temperature again became normal, the pulse less frequent, the secretion gradually less, and the general condition of the patient improved considerably, leaving him, however, a great deal weaker physically and psychically much more depressed. He repaired to the bath-tub only occasionally and for short periods on account of increasing weakness, although he longed for the relief afforded by the bath.

Throughout the remainder of August the disease continued its course with little change; the temperature showed occasional elevations to 100.8° and 101.4°; the pulse retained a frequency of 90 beats and over. While the patient was able to take sufficient quantities of nourishment, as the mouth and throat were in much better condition again, and the secretion therefrom had almost entirely ceased, the bowels exhibited a tendency to looseness, three to five passages a day being the rule. The local process on the skin showed occasional remissions, but short and slight. From the time the bath was given up the scaling became much more conspicuous, and on some parts considerable accumulation of the brittle, grayish or yellowish scales took place, often hiding from view the real condition of the denuded corium underneath and exhibiting more distinctly that condition to which the name of pemphigus foliaceus owes its origin. At the same time a peculiar smell, mentioned by several authors, became noticeable, to gradually give way to the more decided offensive odor of decomposing epidermis. Altogether the patient presented a most pitiable sight: new blisters were constantly appearing all over the body, repeated eruptions taking place on the same localities, and hardly a square inch of normal skin could be found. Now the inguinal, now the popliteal region, now penis and scrotum, now neck and back, were the parts principally affected, generally showing the corium exposed over a large area, with bleeding and oozing fissures wherever the skin is exposed to flexion and extension; even the face became affected extensively, particularly the chin, lips, and eyelids, which at different times were entirely devoid of epidermis or covered with black crusts. The conjunctiva of the lids and of the bulbs blistered in their turn, and sores remained on the swollen mucous surface for some time. Around the heels the blistering process became extremely painful, owing in part to the thickness of the epidermis, which could not be detached so easily, and with its sharp, hard edges cut deep, extremely sensitive fissures. To relieve the local lesions, lotions, powders, ointments, plasters, and cotton padding were employed wherever it was found possible to do so, but scarcely had the last spot been attended to when the first ones again required attention, so that there was not a moment of real rest or comfort. Arsenic was continued as regularly as possible, together with opiates to check the diarrhœa.

About the 1st of September the mouth, throat, and larynx again became worse, while externally several places began to dry up. Owing to my absence from New York, I did not see the patient again after that date. From personal communications from the attending physician, Dr. Jul. Scheider, and from notes taken by the nurse, I shall briefly report the final course of the disease: The rise of temperature was more constant and more pronounced, reaching 102.4° on the 2d and again on the 5th of September, after a slight remission; it attained 103° on the 6th, to fall again to 102.6° on the following days. The pulse became much more frequent: after rising to 108 on September 4th, it increased to 128 on the 5th, 130 on the 6th, 136 on the 7th, and continued about 120 to the end. Diarrhœa became much more profuse from day to day, six passages occurring on the 1st of September, eight on the 2d, nine on the 3d, ten on the 4th and 5th, twelve on the 6th, twenty-one on the 7th, 8th, and 9th. The patient gradually lost strength, without ever losing consciousness, and died on the morning of September 10th. During the last few days, with the rapid increase of diarrhœa, no more new blisters appeared.

There is a certain temptation to range this case among the cases of dermatitis herpetiformis on account of the intercurrent appearance of the clusters of small, very itchy vesicles on hyperæmic patches, which, indeed, were more or less herpetiform, but otherwise the disease did not exhibit the characteristic features of dermatitis herpetiformis. In the later stages the disease had much in common with impetigo herpetiformis, the contents of the bullæ being purulent from the start, in many instances; but for a long period there existed only bullæ with clear, serous contents and no pustules at all, thus distinctly differing from impetigo. Unfortunately, no autopsy could be obtained, which certainly would have elucidated one point in which I was particularly interested—the origin of the diarrhœa. I have little doubt that it was due to the extension of the pemphigoid process (of forming bullæ and destroying the epithelial cover) to the intestinal tract. There is certainly some probability of such an occurrence in view of the participation of the mucous membranes of the oral cavity, the larynx, and the œsophagus; and this supposition finds a valuable support in the observation in Dr. Graham's case, where the report on the autopsy says:[1] "Mucous membrane along the lesser curvature of the stomach was congested, and about twenty spots were discovered which nearly resembled some of the patches of eruption on the skin. The spots varied in size from that of a pea to a ten-cent piece, and on close inspection were found to consist of superficial ulcerations, some extending partly and some altogether through the mucous membrane. The mucous surface of the large intestine was very much congested and thickened in some places. Death seems to have been hastened by the eruption, so to speak, on the mucous surface of the stomach."

Concerning the effects of treatment, I must candidly confess that I do

[1] Canadian Journal of the Medical Sciences, 1879, p. 172 et seq.

not believe the course of the disease was at all influenced by the same. There were, indeed, several periods of improvement, but I consider them rather as spontaneous fluctuations—exacerbations and remissions being more or less the rule in all cases of chronic pemphigus. I therefore cannot agree with Dr. Bulkley as to the effectiveness of arsenic, certainly not in the case of Mr. T., although I am well aware that in a number of cases it has undoubtedly been given with great benefit and is considered almost the only remedy worthy of a trial. It was given early and later on certainly in abundant doses, but, as the final result proved, without real effect. I cannot suppress a suspicion that arsenic had something to do with the profuse passages, although I cannot bring forth any positive evidence in favor of this opinion. Generally, arsenic shows its best results in skin diseases accompanied by dryness and scaling, rather where an excessive formation of the corneal layer of the epidermis takes place. Why it should have the same effect in a disease where the formation of epidermis is defective, rather, and a constant loss of the same takes place, as in pemphigus, is not easily understood. Although we have lately heard less of the advantages of the internal use of ichthyol as proclaimed by Unna, I should feel inclined to try it whenever I may meet with a similar case again.

The external applications were made with the purpose rather of relieving the suffering of the patient than of effecting a cure. There is no doubt in my mind that the use of the protracted bath gave the greatest relief, and that it ought to be resorted to wherever practicable.

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DR. FINLAY'S MOSQUITO INOCULATIONS.

By George M. Sternberg, M.D.,
Lieut.-Col. and Surgeon, U. S. Army.

My friend Dr. Finlay, of Havana, has recently published in The American Journal of the Medical Sciences (September, 1891) the statistics of his "preventive inoculations" against yellow fever by means of mosquitoes. As the editor of a prominent medical journal[1] has devoted an editorial article to the subject in which he says "the results would seem to show that this insect is a good attenuator of yellow-fever virus," I think it proper to make a few remarks with reference to these so-called "mosquito inoculations," especially as I did not consider it necessary to refer to them in my published reports upon the etiology and prevention of yellow fever. I have not considered the subject as demanding serious attention, for the reason that *the mosquito does not inject the blood drawn from a yellow fever patient into the inoculated individual, but it*

[1] The Medical Record, New York, September 19, 1891.

enters the insect's stomach, and whatever remains after its meal has been digested is passed per anum.

When the mosquito introduces its proboscis into the individual who is to be inoculated it is for the purpose of withdrawing blood, and it is difficult to see how any inoculation can occur, unless some virus has adhered to the exterior of the delicate instrument during the considerable interval which elapses after one full meal before the insect can be induced to fill itself again.

This supposition, viz., that a minute quantity of virus adhering to the surface of the proboscis of the insect is sufficient to produce a mild attack of the disease in an unprotected person, does not appear very probable, and very positive experimental evidence will be required before it can be accepted, especially as we have some experimental evidence which indicates that the blood of an individual sick with yellow fever may be injected beneath the skin of an unacclimated person without producing any noticeable effect.

In my official report, published in 1889,[1] I gave the following account of experiments made in my presence by Dr. Daniel Ruiz, of Vera Cruz:

"If the infectious agent in yellow fever is present in the blood, we would expect that the disease may be transmitted by inoculating a susceptible person with blood drawn from one sick with the disease. Dr. Finlay, of Havana, believes that the disease is commonly transmitted by mosquitoes, which, after filling themselves from a yellow fever patient, transmit the germ by inoculation into susceptible persons. Evidently the most satisfactory and direct way of determining whether the infectious agent is present in the blood would be to make inoculation experiments in susceptible persons. Before going to Brazil I had considered the possibility of making this crucial experiment, and had determined to make it if opportunity offered. When in Vera Cruz I learned that the experiment had already been made in 1885 by Dr. Daniel Ruiz, director of the civil hospital in that city. Dr. Ruiz is an entire unbeliever in the infectious nature of yellow fever, and had no confidence in the alleged discovery of a yellow fever germ by Dr. Carmona, of the City of Mexico. In order to test in a practical manner the truth of his views, he made, in 1885, injections of blood and of urine from typical cases of yellow fever into the subcutaneous connective tissue of an 'unacclimated' person. The result of these inoculations was negative. At the time of my visit to Vera Cruz he expressed his entire willingness to repeat these experiments in my presence. This was exactly what I desired, and accordingly Dr. Ruiz made three inoculation experiments upon three unacclimated persons in the hospital. Unfortunately, the blood used for two of these individuals was obtained from a case in which the pathological appearances did not fully sustain the diagnosis of yellow fever made during life. This case is one of great interest with reference to the question of diagnosis, and I shall give a tolerably full account of it. The third inoculation was made from a non-fatal case in the eighth day of sickness; urine still albuminous; skin yellow. Fifty cubic centimetres of blood were drawn from the median vein of this patient by means of a hypodermic syringe, which had been carefully sterilized. This was immediately after injected, subcutaneously, in the deltoid region, into the arm of a man aged forty years, from the interior of Mexico, who had been in Vera Cruz only twenty days. The man from whom the blood was taken was apyretic, and the experiment is open to the criticism that it was perhaps too long after the inception of the malady. I was, there-

[1] Annual Rep. Sup. Surgeon-Gen. Marine-Hospital Service, 1889, p. 166.

fore, anxious to make other experiments before leaving Vera Cruz, but the time fixed by my orders expired without my having had an opportunity to do so."

I do not consider the experiments made as entirely conclusive; but, on the other hand, I know of no experimental evidence which goes to show that the blood of yellow fever patients contains the virus of the disease, and that yellow fever can be transmitted by inoculations with such blood. Before admitting that the virus can be attenuated by passing through the body of the mosquito, I think we should have some satisfactory experimental evidence that the infectious agent is present in the blood. But, as stated, if it were present it would be passed with the excrement of the insect, and not injected into the inoculated individual.

In Dr. Finlay's last paper he says:

"I infer that the insect has some way of rendering its outer surface aseptic, and probably does so through a very peculiar operation, which I have often seen it perform. This consists in collecting with its hind or middle legs a secretion expelled from the posterior part of its body, and besmearing very persistently with it every part of its body—legs, wings, head, and proboscis."

If the exterior of the proboscis is rendered aseptic by this operation, it is difficult to see how any inoculation can occur even if the blood of the yellow fever patient constituted the true virus of the disease.

The transmission of the filaria sanguinis hominis by the mosquito is a very different matter from the mode of transmission imagined by Dr. Finlay in the case of yellow fever. The embryo filariæ are taken into the body of the insect with blood drawn at night from the infected individual, and, according to Manson, undergo certain developmental changes in the intermediary host, and are subsequently discharged into water with the larvæ of the insect. Other individuals are presumably infected by drinking this water.

But the *à priori* objections raised against Dr. Finlay's so-called "inoculations" must give way if it can be shown that decided and constant results follow the application of a mosquito, which has filled itself with blood from a yellow fever patient, to an "unacclimated" person. We fail to find satisfactory evidence that this is the case. In Dr. Finlay's published reports of his experiments we find that of 52 persons inoculated, only 12 (Group II.) "experienced, within a period of days varying between three and twenty-five after the inoculation, an attack of fever with or without albuminuria." Now that 12 out of 52 unacclimated persons arriving in Havana should suffer mild attacks of fever, "with or without albuminuria," is not surprising; and inasmuch as 40 other persons inoculated did not suffer similar attacks within twenty-five days after the supposed inoculation, we see no reason for ascribing the slight attacks of fever suffered by these 12 to the application of a mosquito by Dr. Finlay. If these 12 had all suffered characteristic attacks of yellow fever within a few days after the so-called inoculation, the

experimental evidence might have some weight; but the attacks recorded occurred at intervals of from three to twenty-five days, whereas the period of incubation in yellow fever is generally admitted to be comparatively short, and probably does not exceed three to five days. Moreover, the slight febrile attacks experienced without albuminuria cannot be identified with yellow fever, and if they could, would be more rationally accounted for by ascribing them to the recent arrival of these individuals in a yellow-fever-infected city.

As to Dr. Finlay's Group IV., "twenty-four who did not experience pathogenic effects within the twenty-five days, but subsequently had fevers of a mild type, either non-albuminuric or with slight or transient albuminuria," we do not see any reason for supposing that the mosquito inoculation was in any way concerned in the development of these attacks. Such attacks are common in Havana and in tropical or semi-tropical countries generally. Whether such attacks in newcomers in yellow-fever-infected ports are to be considered "fevers of acclimation," and to what extent they afford protection against subsequent attacks of yellow fever, has not been fully determined. But that such attacks frequently occur, and that strangers arriving in Havana or in Rio de Janeiro frequently remain in these infected cities for several years without suffering any more pronounced attack of yellow fever than this so-called "acclimating fever," is a matter of common observation among physicians in the cities mentioned.

Finally, we call attention to the fact that four of the individuals inoculated by Dr. Finlay subsequently suffered genuine attacks of yellow fever; that one of the four died, and two of the remaining cases are said to have been severe.

As to Dr. Finlay's comparative statistics we shall say nothing at present, except that such comparisons call for a very careful analysis of the facts relating to surroundings, exposure, etc.; and that medical literature abounds in similar comparisons, in which the value of a certain treatment appears to have been established by statistics, but in which, unfortunately, a more extended trial by other members of the profession has failed to confirm the sanguine expectations of the author of the method. So far as I am aware, there has been no confirmatory evidence by other members of the profession in Cuba, and no one has felt sufficiently impressed with its value to repeat the experiments of Dr. Finlay and his associate, Dr. Delgado. I esteem both of these gentlemen very highly, and I would welcome most gladly a demonstration of the value of the method which they faithfully endeavored to test. But a justifiable scientific scepticism makes it necessary to demand more direct and satisfactory proof that the so-called inoculations produce any pathogenic effect before any great importance can be attached to the results of Dr. Finlay's laudable efforts to discover a method of prophylaxis in yellow fever.

REVIEWS.

LEÇONS DE THÉRAPEUTIQUE. Par GEORGES HAYEM, Professeur de Thérapeutique et de Matière Médicale à la Faculté de Médecine de Paris; Membre de l'Académie de Médecine. Troisième série. Pp. 450. Paris: G. Masson, 1891.

LECTURES ON THERAPEUTICS. By GEORGES HAYEM, Professor of Therapeutics and Materia Medica of the Faculty of Medicine of Paris; Member of the Academy of Medicine. Third series.

THIS work on Therapeutics, coming from a country of which the medical literature has been, each year, enriched by contributions from the clinics of Germain Sée and Dujardin-Beaumetz, justly claims our attention. The name of the author, well known for nearly two decades, is a sufficient guarantee for sound laboratory work, extensive reading, and wide experience. It is, then, with more than ordinary interest that we take up this volume discussing the action of remedies.

The first twenty-two pages are devoted to a general introduction, closing with a brief statement of the results of intra-venous transfusion of blood, considered as a prophylactic measure, in which the observations of Wooldridge, Richet, Héricourt, Büchner, Behring, Kitsato, and the author are recorded. The fact that we are apparently about to enter upon a scarcely explored territory, the resources of which we can only surmise, gives great value to the clear statement of the results thus far recorded. The completion of a study of the drugs for the relief of pain, commenced in the preceding volume, occupies one hundred and sixteen pages. Although the older drugs have been less studied during the past few years because of the great interest that the synthetic compounds of organic chemistry have excited, yet the clearness with which the presentation of the useful and harmful effects of opium and its derivatives is set forth, calls for commendation. The subject of mixed anæsthesia, at one time a theme so fruitful for discussion, has received full justice, and the advantages as well as the dangers are fully recorded. Although the standpoint taken is that of the use of chloroform, yet the views there expressed will find acceptance amongst American practitioners.

Taking up the Solanaceæ, one is reminded of the interesting work of Harley, *The Old Vegetable Neurotics*, so thoroughly is the task performed, while in this section the more recently discovered alkaloids receive full attention. The treatment by aconite, the products of conium and of gelsemium suggest many uses known to the last generation, when pharmaceutical resources were not so abundant.

When we reach the chapter on sedatives of the aromatic series, we find a carefully considered *résumé* of the effects upon man, of quinine,

salicylic acid, antipyrine, acetanilide, the phenacetines and exalgine. The poisonous effects of acetanilide are shown to be due, citing Lépine, Weill and Herczel, to the transformation of hæmoglobin into methæmoglobin, while the harmlessness of phenacetine, which does not give rise to aniline by decomposition in the blood, is clearly stated. The reviewer would submit that a daily dosage of fifteen grains of exalgine is considerably larger than is warranted by American practice. Without undue enthusiasm, yet with full consciousness of the value of these drugs, we consider this section to be excellent. Its careful perusal will lift many a physician from the rut in which he is unconsciously moving. Electricity for the relief of pain, revulsive and surgical measures, with a very complete *exposé* of the plan of therapeutic action, brings this part of the work to a fitting conclusion.

Three lectures are devoted to a discussion of the hypnotic drugs. Dividing insomnia into two classes—that of (1) nervous and of (2) dyscrasic origin—he presents for consideration, paraldehyde, amylene hydrate, urethan, sulphonal, and hypnone. The more recently discovered derivatives of chloral, as chloralamide, ural, and somnal, are timely acquisitions to our pharmacopœia in view of the great demand for remedies that shall be as efficient as chloral but without its harmful effects. Hypnal, a combination of chloral and antipyrine, receives praise as a hypnotic even if the insomnia be due to painful symptoms. Methylal, cannabis Indica, piscidia and its active principle, piscidine, receive perhaps more attention than their importance would seem to justify. The subject is concluded by a review of the physical means of producing sleep.

About sixty pages are occupied by a presentation of remedies known as anti-spasmodics. The author gives an excellent review of the numerous and interesting researches concerning the phenomena of convulsions, taking into consideration both central and peripheral causes. In the treatment by the bromides, and especially by the bromide of potash, we find evidence of a careful study; while the drugs more properly anæsthetic and hypnotic, as Calabar bean, picrotoxine, nicotine, curare, hydrocyanic acid, the derivatives of valerian, pilocarpine, camphor, asafœtida, the nitrites, and the salts of zinc, are fully discussed in this connection. We notice that even simulo is not passed without comment, although no opinion is expressed as to its value. Physical measures, such as the various methods of hydro-therapy and electricity, conclude the presentation of the subject.

Under the head of remedies for the relief of anæsthesia we find a most interesting discussion of results from the application of electricity, metallo-therapy and metalloscopy, including that of magnets. In the forty pages concerning excito-motor remedies, we find much for our consideration. The careful physiological investigation of nux vomica and its alkaloids, and the therapeutical indications deduced therefrom, have prominent place. The action of arnica, ergot, phosphorus, and arsenic receive due mention. The electrical treatment and methods of diagnosis by electricity are so fully and accurately set forth that one can readily believe that he is reading more than the usual information contained in text-books on general therapeutics.

Ten lectures are occupied with the study of drugs especially directed toward the relief of cardiac diseases. The author believes that the subject can best be considered by dividing the morbid elements, so far

as the symptoms are concerned, into three classes, each calling for a particular medication. For the description of the first class he has coined the word "kinesitaraxia" (from *κίνησις*, movement, and *τάραξις*, trouble). This class includes the mechanical disturbances, the heart-muscle and nerves being healthy; for the second class, "asystolia," an enfeeblement of the heart of nutritive origin or cardiac weakness; for the third class, "ataxia," the nervous troubles of the heart, primary or secondary, the cardiac neurasthenia. He presents a clear view of the subject because he accepts, with the physiologists, the statement that cardiac tonics are really cardiac poisons. Taking this view, then, we follow his argument with great interest. Digitalis, and its derivatives, the drug above all others whose physiology gives accurate indications for its therapeutic use, are fully treated; even the physiological experiments of Williams, the importance of which is too little recognized in his own country, have by no means escaped the observation of the author, nor have they failed of proper appreciation. Squill, convallaria, adonidine, and strophanthus have received the same careful attention as digitalis. If we accept, with Schmiedeberg, the hypothesis that digitalis increases blood-pressure by modifying the cardiac energy, and that this action has as a consequence a greater filling of the arteries, we have a good basis for the accurate therapeutical indications unfolded by the author. These indications are equally well marked out for squill, sparteine, caffeine, adonidine and strophanthus. In the treatment of cardiac weakness the author believes in the use of such stimulants as alcohol, ether, ammonia and caffeine in acute cases. In the chronic form, sparteine, strophanthus, opium in small doses, the nitrites, iodide of potash (Sée), iron and arsenic. Further it is insisted that great care shall be exercised to ascertain the exact physical competency of the heart. In the treatment of the disturbances of cardiac innervation are considered the bromides, chloral, quinine and the valerianates. In general the treatment of cardiac diseases, following the plan described by the author, is based on sound physiology, confirmed by careful clinical observation.

One cannot lay aside this book without feeling that he has placed himself abreast of the times as regards therapeutics, and that he has a more just conception of the value of the newer drugs than those interested in their commercial possibilities have given him; that he has received from a master's hand the latest authoritative statement concerning many remedies not ordinarily found in the text-books; and that (and it is by no means of little value) in the form of lectures this volume has imparted to him the enthusiasm born of the speaker's personality. The work has the thoroughness of that of Fonssagrives, with which, as a student, the reviewer was familiar, together with the vigor of the modern French school, tempered by the results of a careful review of the opinions of eminent clinicians. In an English translation it would be a welcome addition to the library of every practical physician.

R. W. W.

LEAD-POISONING IN ITS ACUTE AND CHRONIC FORMS. (The Gulstonian Lectures, delivered in the Royal College of Physicians, March, 1891.) By THOMAS OLIVER, M.A., M.D., F.R.C.P., Professor of Physiology, University of Durham; Physician to the Royal Infirmary, Newcastle-upon-Tyne. Pp. 121. Edinburgh and London: Young J. Pentland, 1891.

THE profession is indebted to Dr. Oliver for an interesting and instructive essay on lead-poisoning, a condition the manifestations of which are unfortunately so protean and often so insidiously developed that not rarely we fail to trace them to their origin. As stated by Dr. Oliver, the subject of plumbism is not only of local but of national importance. This applies to other nations than Great Britain, but especially to our own, than which none is more heedless of the physical well-being of its denizens. Adulteration of food here runs riot, uncontrolled by statutes which, if they exist, have actuality only in name, and ill-health thus generated is too frequently perpetuated through the ignorance of our *medici*, who are permitted by the flimsiness of our laws to juggle with human life without other than a primer-like knowledge of the rudiments of medicine.

How frequently lead-poisoning arises, not only in other trades than lead-making, and through other channels than occupation, none save those having this fact constantly in mind are well aware. The occurrence of lead-poisoning through drinking-water, food, the use of cosmetics, hair-dyes, and the like, is sufficiently common, and its manifestations sufficiently insidious and unexpected, to permit the unwary practitioner to be often misled.

Dr. Oliver's brochure is not an extended treatise on lead-poisoning, the limit of three lectures not permitting the subject to be considered in some directions more than in outline. This is the more to be regretted because of his ample experience. As it stands, however, the book contains numerous original pathological and clinical facts of value. Some of the former are based on experimental work which reflects great credit on Dr. Oliver.

We note that Dr. Oliver is inclined to regard the gingival blue-line as of local origin, due to absorption of the metal from the mucous membrane of the gum rather than to its precipitation from the blood by the action of sulphur, originating from decomposing food elements in contact with the teeth forming an insoluble lead sulphide from the soluble salts of lead circulating in the loops of vessels in the gingival margin and in the plasma of the perivascular spaces. The former view, which is that of Grisolle, Bouillard, Gübler, and others (Dechambre's *Dictionnaire Encyclopédique des Sci. Méd.*) who do not regard the blue-line as a sign of lead-intoxication, appears to the reviewer to be negatived by the fact that a very marked line occurs in cases of plumbism arising solely through drinking-water containing too small an amount of the metal sufficient to be absorbed from the gum margin to originate a decided blue-line. The reviewer has seen a number of cases of plumbism due to drinking-water slightly impregnated with lead, in which a marked blue-line was present, and Dr. Oliver records on page 13 two cases of lead-poisoning with a blue-line occurring similarly, in which the water contained but 0.0028 grains per gallon.

Dr. Oliver holds, with Erb, Oeller and Romberg, that the primary seat of the lesion in lead-palsy is, in all probability, usually in the spinal

cord, a view that has much in its favor, though it is at present far from being generally accepted. If the lesion is primary in the intra-muscular motor nerves, Dr. Oliver justly inquires, why should motor fibres, which are efferent, suffer from an ascending lesion, while the sensory (afferent) nerves nearly always escape? Pathological changes are probably not detected in the cord, because but a limited cornual area is allotted to functionally related groups of muscles, which may be readily overlooked in the examination. Erb (*Electro-therapeutics*), who reasons similarly, states: "*Gross* lesions cannot be looked for in a toxic process which usually recovers in a short time, and the *function* of the anterior gray columns and their ganglion cells may be very markedly disturbed, although no change can be demonstrated microscopically. And this disturbed function may produce degenerative atrophy of the peripheral nerves as readily as a primary affection of these tracts." In addition to citing other cases in which central lesions were found, Oliver also quotes Monakow and Oeller, each of whom have reported a case of lead-palsy in which decided changes were detected post-mortem in the anterior cornu. In the latter's case alterations were also found in the peripheral nerves, but far less advanced than those in the cord. The character of the cord lesion in this case—hemorrhages and softening in addition to advanced atrophy of the ganglion cells—indicated beyond doubt its primary character. To the reviewer's mind the fact that the palsy affects functionally related muscle groups, and is usually unaccompanied by sensory alterations, is the strongest argument against the peripheral origin.

Dr. Oliver's view regarding the probable cause of lead-eclampsia and other symptoms of encephalopathy is interesting. He looks upon the cerebral manifestations of plumbism as due rather to the retention in the body of animal poisons (leucomaïnes?) through deranged metabolism, and imperfect action of the excretory organs, especially the liver and kidneys, than to the deposition of lead in the brain, however intimately it may be combined with the protoplasm of nerve-cells. In his opinion it is usually found in too small an amount to account for the symptoms.

Blythe (*Journal of Mental Science*, January, 1888), it may be recalled, has shown that the greater portion of lead found in the brain in cases of encephalopathy ending fatally, exists in chemical union with the complicated nitrogenous and phosphorized fats, as lead-kephalin, forming a definite substitution compound, in which a molecule of hydrogen is replaced by one of lead. It appears to the reviewer that but a grain of lead so disposed (the amount found in the brain in one of Oliver's cases) would be sufficient to originate the various phases of encephalopathy. As suggested by Blythe, so important a modification as the replacement of hydrogen in its molecule by lead, which is not a structural change, but one of composition, must profoundly modify, if not annihilate, whatever function kephalin may possess. Hughlings-Jackson's view of the origin of epileptiform seizures (*Lumleian Lectures on Convulsive Seizures*, 1890) is very suggestive in this connection. He regards them as due to an unstable condition of a few nerve-cells, owing to an unduly free interchange occurring between the contents of the cell and the surrounding fluid which bathes it, leading to an alteration in composition while its constitution remains unchanged. He instances stable glycerin being transformed into explosive nitro-glycerin without alteration in its

constitution, by a substitution of a molecule of hydrogen by one of nitrogen peroxide. Is it not likely that a cell thus lead-saturated would be not only incapable of proper function, but highly unstable, constantly tending toward discharge?

Curiously, Dr. Oliver nowhere speaks of lead-arthralgia, a form of joint pain unattended with redness or swelling, and probably due to a neuralgia or neuritis of the intra-muscular and articular sensory nerve filaments. In this country it is a very common and early symptom of lead-intoxication. He deals very briefly with the therapeutics of plumbism, and here offers us nothing new. For the convulsive phase of encephalopathy he advises amyl nitrite, mentioning no other remedy save pilocarpine, which he resorts to when the seizures are accompanied by suppression of urine. The reviewer has used amyl nitrite and nitroglycerin alternately, the former by inhalation, the latter subcutaneously, successfully as regards breaking the spasm, but he has found both of scant avail in preventing a return. He prefers to rely on a very full dose (a half-grain or more in an adult) of morphine hypodermically, and chloral and potassium bromide by the mouth or rectum to prevent recurrence where the convulsions show a tendency to rapid repetition. Acute seizures of this sort, if not early controlled, terminate very early fatally.

D. D. S.

A Clinical Text-book of Medical Diagnosis for Physicians and Students, Based on the Most Recent Methods of Examination. By Oswald Vierordt, M.D., Professor of Medicine at the University of Heidelberg; formerly Privat-docent at the University of Leipzig; later, Professor of Medicine and Director of the Medical Polyclinic at the University of Jena. Authorized Translation from the second improved and enlarged German edition, with Additions. By Francis H. Stuart, A.M., M.D., Member of the Medical Society of the County of Kings, New York; Fellow of the New York Academy of Medicine; Member of the British Medical Association, etc. With 178 illustrations, many of which are in colors. Philadelphia: W. B. Saunders, 1891.

This is an octavo volume of 700 pages, of which the last 93 are devoted to the index.

The work is divided into three parts, the first being introductory, and, therefore, largely concerned with the explanation of terms of frequent recurrence, and with the proper mode of recording cases; the second, dealing with the general examination of the patient, such as—1, his physical condition; 2, his decubitus; 3, his general structure and state of nutrition; 4, his skin and subcutaneous cellular tissue; 5, his temperature and pulse; while the third is devoted to special diagnosis.

The various diagnostic methods in diseases of the respiratory and circulatory systems, the digestive and urinary apparatus, and the nervous system, are detailed with great clearness, and are evidently described by one who is himself an expert in them all. In addition, there is a short appendix containing directions as to laryngoscopical and ophthalmoscopical examinations and the staining of bacilli. The translator has performed his arduous work in an excellent manner, and has interpolated some practical additions.

Allusion has been made to the apparently disproportionate size of the index to this book, but not with the object of unfavorable criticism, for it is in a work of this class that one wishes to turn as rapidly as possible to the facts concerning a symptom which may be common to many diseases, and which are, therefore, widely scattered through its pages. An elaborate index is, therefore, a necessity.

Both the typography of the book and its illustrations are good, and we heartily wish it the success it has met with in Germany.

F. P. H.

HANDBOOK OF DISEASES OF THE EAR, FOR THE USE OF STUDENTS AND PRACTITIONERS. By URBAN PRITCHARD, M.D. Edin., F.R.C.S. Eng., Professor of Aural Surgery, King's College, London, etc. Second edition, with illustrations. Pp. 238. Philadelphia: P. Blakiston, Son & Co., 1891.

IN preparing a second edition of this book the author has revised the whole, rewritten a large portion of it, and added much new matter. The increasing attention which is being paid to the effects of naso-pharyngeal disease upon hearing has led the author to give a special chapter to these subjects. Another chapter is devoted entirely to the consideration of the important complications and sequelæ of middle-ear suppuration, including mastoiditis and cerebral abscess. Otomycosis and exostosis in the external ear receive fair consideration. We are surprised that when chronic suppuration in the attic is under consideration the author offers no method of treatment which he considers efficient in curing the disease, but condemns, evidently without ever having tried it, as he considers it "obviously a serious operation," the only means of a radical cure in these cases, viz., excision of the diseased membrana, malleus, and incus. This operation has never, so far as the reviewer knows, been followed by any reaction; on the contrary, it has invariably been followed by a cure of suppuration in the antro-tympanic space. It is no more "obviously a serious operation" than perforation of the mastoid. It is amazing that so useful an operation should be condemned, apparently purely on *à priori* grounds, without any evidence that the author of the book has either tried it or seen it performed. We regret that in a work offering so little that is new, there should be found a rejection of the only rational modern means of curing chronic suppuration in the attic space, while pages are devoted to discussing artificial drum-membranes, though no aurist of experience often resorts to their use. No one should wear such a thing in his diseased ear, excepting perhaps for a very short period in some special cases, under the constant supervision of an aurist. Patients should never be allowed to apply any form of artificial membrana tympani to their ears by themselves. To say the least it is a septic proceeding, unless carefully carried out and watched by a competent surgeon. The chapter on mastoiditis is a succinct account of the best methods of combating this very important malady.

C. H. B.

COLLECTED CONTRIBUTIONS ON DIGESTION AND DIET. By SIR WILLIAM ROBERTS, M.D., F.R.S., formerly Physician to the Manchester Royal Infirmary, and Professor of Medicine in the Victoria University. Small 8vo, pp. xi., 261. Philadelphia: Lea Brothers & Co., 1891.

IN this volume Sir William Roberts has collected all his contributions on subjects relating to Digestion, Dietetics and Dyspepsia, beginning with the Lumleian Lectures of 1880, "On the Digestive Ferments and Artificially Digested Foods," and including an address "On Some Practical Points in Dietetics," delivered before the Manchester Medical Society in 1890. A certain degree of order and coherence has been given by some re-arrangement of materials and grouping of subjects, but no attempt has been made to produce a systematic treatise. All the articles have been carefully revised.

To Sir William Roberts, above all others, we owe that great advance in the feeding of the sick represented by the employment of predigested foods; and the number of lives he has thus been directly instrumental in saving is simply incalculable.

The four sections in which the subject-matter is now grouped are—I. Digestion and the Digestive Ferments; II. Dietetics; III. Preparation of Food for Invalids; IV. Dyspepsia.

Upon questions in the physiology of digestion that are still unsettled the author expresses himself with proper reserve; upon all others with the authoritative clearness we expect from a teacher. In practical applications of the principles derived from the study of physiology he is fertile. His directions are clear, full, precise. S. S. C.

A TREATISE ON THE DISEASES OF INFANCY AND CHILDHOOD. By J. LEWIS SMITH, M.D. Seventh edition, thoroughly revised, with fifty-one illustrations. Philadelphia: Lea Brothers & Co., 1891.

A BOOK which has reached its seventh edition surely demands no critical review. We have always considered Dr. Smith's book on Children one of the very best on the subject, and as each edition appears, the weeding that it has undergone, the planting that has taken place, the cultivation of untouched soil, shows the careful gardener, the successful cultivator, the fruits of whose toil are evident throughout this continent.

Dr. Smith's book has always been a practical book—a field book; theoretical, where theory has been deduced from practical experience—he takes his theory from the bedside, and from the pathological laboratory. He does not conceive his theory first and practice afterwards.

The very practical character of this text-book has always appealed to our fancy. It is characteristic of Dr. Smith in all his writings to collect whatever recommendations are found in medical literature, and his search has been wide, comprising the medical journals of the day. Indeed, in many instances, after reading pages of what others think, one sometimes says: But what does Dr. Smith say, and what are his recommendations?

Possibly, he carries this too far. Nevertheless, one seldom fails to find a practical suggestion, after search in other works has been in vain. We cannot agree with several of the best authorities of the day that pædi-

atrics is not a specialty in itself. It may not be to-day, but it will be to-morrow. The symptoms, course, ultimate result, and treatment of diseases of children—indeed, many of the diseases themselves—are entirely different from those of adults, and, in our opinion, the sooner the profession recognize this, the sooner will infant mortality diminish.

In the seventh edition we note a variety of changes in accordance with the progress of the times. Obsolete material has been excluded, and the text condensed, and such matters added as conjunctivitis, icterus, sepsis, umbilical diseases, hæmatemesis, sclerema, œdema, pemphigus of the newborn, epilepsy, tetany, appendicitis, typhlitis, perityphlitis, and intubation.

But, to show how thorough has been the revision, one need only turn to the article on diphtheria. In the sixth edition this occupied thirty pages; in the present one we find a most exhaustive article of eighty-four pages, giving us the pathology up to date, and a most exhaustive section on treatment, in which the author for the first time in this text-book recommends the use of corrosive sublimate. We expect soon to see the seventh edition exhausted, and that when the eighth edition is called for we shall see the article on scrofula rewritten, and a section devoted to the diseases of the heart—a subject of great importance—the diseases of the liver, the diseases of the kidney, the diseases of the nervous system, the diseases of the blood, malaria in its various types, and such matters, that are of equal importance to any mentioned in the book before us, but which need discussion under special sections, that they may be referred to by the busy practitioner. The article on malaria, (at present, on intermittent and remittent fever), we think will scarcely satisfy the practitioner outside of New York. Indeed, the whole subject of fevers is one of the most unsatisfactory in Dr. Smith's book. The article on cerebro-spinal fever is a most exhaustive one. We should say far too much space has been given to it; whereas no mention whatever is made of the subject of ephemeral fevers which are so common during child-life, so annoying to the physician, so great a cause of anxiety to the parent, so difficult to differentiate, and so unsatisfactory to treat.

Dr. Smith's work still stands foremost as the American text-book. The literary style could not be excelled; its advice is always conservative and thorough; the evidence of research has long since placed its author in the front rank of medical teachers. For many years he has led the advance as the able and conservative teacher of pædiatrics, and we surely voice the feelings of his vast array of students and admirers throughout the continent when we wish that he may live long to give us the results of his great experience. J. M. K.

DIE KRANKHEITEN DER ATHEMORGANE, MIT SPECIELLER RÜCKSICHT AUF JAPAN. Bearbeitet von DR. E. BAELZ, Professor der klinischer Medicin an der Kais.-Universität zu Tokio. Mit 1 Titelbild in Farbendruck und zahlreichen Holzschnitten. Tokio, 1890.

DISEASES OF THE RESPIRATORY ORGANS, WITH SPECIAL REFERENCE TO JAPAN. By DR. E. BAELZ, Professor of Clinical Medicine in the Imperial University, Tokio.

THE rapid progress made by the Japanese in the appropriation and assimilation of Western science is nowhere more marked than in the

domain of medicine. The domination of Germany in scientific medicine is perhaps shown by the fact that Berlin and Vienna, rather than London and Paris, furnish teachers to the Japanese schools. The present volume is the first one in which an attempt has been made to set forth concisely and authoritatively, for the principal benefit of Japanese students and practitioners, the present status of medical knowledge in a special field; and the work has been apparently very well done. The nose, the larynx, the trachea, the bronchi, the lungs, and the pleura are studied. Each section begins with a brief elucidation of the anatomy and physiology of the parts, and is appropriately illustrated. The colored frontispiece, for example, gives a fairly accurate representation of the gross topographical anatomy of the contents of the chest and abdomen. The first woodcut shows a side view of the nasal chambers in relation with the pharynx, tongue, etc. Next follow methods of examination, and illustrations of the instruments necessary. We notice, in passing, that the author employs Zaufal's long nasal specula, and that the illustration of a laryngoscopic examination has a peculiarly Japanese appearance. Then general diagnosis is taken up, first giving local symptoms, then distant symptoms. There is next a section upon general therapy. After this the individual diseases are taken up in order; their etiology, pathology, symptoms, and therapy being treated briefly or at length, in accordance with the importance of the affection under discussion, and always with special reference to the disease as manifested in Japan. Thus there is a careful study of "parasitic hæmoptoë" or "distomatosis pulmonum," with an excellent illustration of the parasite and of the sputum in this disease, which, of course, we do not ordinarily find elaborated in text-books for the use of European and American practitioners. Of the development of the parasite and the manner of its introduction into the human body, very little is positively known. Japan, Corea, and Formosa are the principal regions in which the disease occurs. In Kumoto it is estimated that no less than 39 per cent. of the school children suffer from it, small children and older persons being less frequently affected. In Nagamo the author saw one family in which five out of six members were affected. Women are very seldom attacked, but one having been found among 102 patients. The only diagnostic point is the expectoration of bloody sputum in which the ova are found.

S. S. C.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.A., M.D.,

PROFESSOR OF CLINICAL MEDICINE IN THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; ASSISTANT VISITING PHYSICIAN TO BELLEVUE HOSPITAL.

The Treatment of Typhoid Fever.

Dr. Sicard, after discussing the inconveniences and dangers in the use of salicylate of bismuth, charcoal, iodoform, naphthalin, and β-naphthol as intestinal antiseptics, in the *Revue de Thérapeutique Médico-chirurgicale* for 1891, No. 17, p. 458, recommends salol in daily doses, from fifteen to forty-five grains. Calomel, given in fractional doses, following the method of Bouchard, although diminishing the mortality, yet gives rise to a long convalescence. He believes chloroform in small doses to be one of the most useful and least dangerous of all. Used by Desprez in 1867 in cholera, and by Stepp in 1888 in gastric ulcer and in typhoid fever, the author administers it in five-drop doses, thrice daily. This dose is dissolved in one thousand parts of water. He further insists that large quantities of fluids shall be prescribed in small doses, frequently repeated, up to six or seven quarts per day; two quarts of milk, one quart of bouillon, in addition to water in which sugar-of-milk is dissolved. The amount of urine passed is frequently five or six quarts daily. This treatment not only favors the elimination of toxic matters, but restores to the organism the water lost through the lungs and skin.

Ergot for Hypodermatic Use.

In the *Therapeutische Monatshefte* for 1891, Heft 7, S. 369, Dr. Biedert gives us a method for using ergotin subcutaneously without danger of producing either indurations or abscesses. He dissolves the extract of ergot in a 2 per cent. watery solution of carbolic acid. In the intervals between the

injections the syringe remains filled with a 3 to 5 per cent. solution of carbolic acid, the needles being kept in a similar solution. At the time of the injection the site selected is cleansed with cotton moistened with the carbolic solution, and the point of puncture covered by a second pledget of cotton dipped in the same solution.

Europhen.

In the same number of the *Therapeutische Monatshefte*, S. 373, we find a bacteriological study of europhen by Dr. W. Siebel. This product is the result of the action of iodine on isobutylorthocresol in the presence of an alkali, and its name, following its chemical composition, is isobutylorthocresoliodide. It is a fine yellow powder, soluble in alcohol, ether, chloroform and oils, but insoluble in water. In view of the widespread use of other derivatives of iodine, as iodoform, iodol, and aristol, this study is timely. On p. 379 Dr. Eichhoff presents the results of a very carefully conducted clinical research, from which he arrives at the following conclusions: It is of value in all cases of venereal disease, gonorrhœa excepted. In two cases of chancroids, simple dusting of the europhen was followed by rapid healing. Constitutional syphilis was favorably influenced by the remedy in all stages, whether applied externally or used by subcutaneous injection. In doses of a quarter of a grain there was no pain, neither general nor local reaction, but large doses (one and a half grains) gave rise to pains in the head and in the abdomen, especially in women. The advantage of the internal administration of this drug lies in the fact that in the organism the decomposition, with the setting free of iodine in the nascent condition, is a slow process. Among dermatological patients cases of parasitic eczema, psoriasis, and favus were not influenced by the application of europhen, but, on the other hand, favorable results followed in crural ulcer, scrofuloderma, exulcerating lupus and burns, the explanation apparently being that the separation of free iodine takes place only in the presence of moisture and not upon a dry surface, like that of the unbroken skin. Iodoform will be of more limited usefulness, because europhen has all of its advantages with none of its disadvantages, while aristol will not be displaced by europhen, but rather be complementary to it. For external use, a 5 or 10 per cent. salve, with 10 per cent. of olive oil in lanolin, or as europhen-traumaticin, one to twenty, is prescribed.

Electric Cataphoresis.

In the *Revue Internationale d'Electro-thérapie*, 1891, No. 12, p. 397, Dr. Imbert de la Touche gives the results of this treatment of gout and rheumatism, using bryonia and iodide of lithia. The immediate results are greater mobility of the joints, lessened local pain; the subsequent results are, tophi and swellings diminish, the patients gain in strength, can more readily bear fatigue, the appetite improves, digestion becomes easy, sleep becomes calm, and the general health markedly improves. Although the author's experience has been limited and of recent date, yet he believes that this treatment protects against relapses, and also against future attacks.

In the same number Dr. Gautier relates his interesting experiences with electro-chemical punctures in local tubercular manifestations. This method

combines the chemical injections of Lannelongue with the electrolytic punctures of Le Fort, and promises to combine the valuable features of each. The author has chosen patients suffering from diseases notoriously rebellious to treatment, and although yet too early to announce the final results, yet he believes that its field is one where a practice of this method will yield brilliant results.

Methyl-bromide.

In the *Asclepiad*, No. 31, vol. viii. p. 239, in commenting upon the dangers from the administration of the methyl- and ethyl-bromides, Dr. B. W. Richardson calls attention to the fact that they decompose readily, and free bromine may be liberated during inhalation, causing rapid spasmodic contraction of both the pulmonary and coronary arteries, with death by syncope. The reasons for this warning are—1st, that these compounds are unstable, being influenced by light, temperature, and exposure to the air; 2d, even when the compounds are unchanged they are irritants; and 3d, they are insoluble. They act quickly, and upon the minute pulmonary circulation, but this very speediness of action is of great disadvantage.

The Iodides of Antipyrine.

In the *Bulletin général de Thérapeutique* for 1891, p. 158, M. Duroy gives a most interesting account of his researches concerning two new organic iodides, the iodides of antipyrine. Dating his investigations upon the antiseptic properties of the iodides from 1853 he believes he has now found a combination superior to those previously known. The proto- and biniodides of antipyrine are pleasant to the taste, and yet in solution prevent the putrefaction of meat, which the iodides of potash and soda do not. Doses of six to nine grains *per diem* are borne without any inconvenience. The proto-iodide appears suited to such conditions as tuberculosis, and glandular enlargements, while the more powerful biniodide should be used in typhoid fever, diphtheria, organic diseases of the alimentary canal, and epidemic diseases. These iodides can be administered in wafers, or rubbed up with sugar, or even placed dry upon the tongue.

Morphine *vice* Codeine and Narceine.

In the *Dietetic Gazette*, 1891, No. 9, p. 177, Dr. J. B. Mattison makes an eloquent plea for the use of less morphine, and in place thereof to prescribe codeine and narceine. No one should be more conversant with the terrible conditions brought about by the use of morphine, since his experience has been extensive in his own special field, and probably no one more appreciates the ease with which the habit is acquired than one whose particular work consists in the care of *habitués*. Referring to a paper by Lauder Brunton, in the *British Medical Journal* for June 9, 1888, in which the analgesic properties of codeine are insisted upon, he believes that with pure codeine we can obtain relief from pain in precisely those cases in which morphine seemed our only resource. He believes, also, that it has distinct and decided hypnotic properties. The gastric symptoms, the dulness and headaches, so often com-

plained of from the administration of morphine, do not follow codeine. The dose need not be increased, nor does it give rise to the indescribable craving of morphine. In following Fischer, with whose valuable contributions he is evidently familiar, he states that the dose is three times larger than that of morphine; the sulphate for administration by mouth, the phosphate for hypodermatic use. Narceine is not an anodyne, and it will not succeed as a soporific, if pain be present. In double the dose of morphine it is efficient in producing sleep. The hydrochlorate (of Merck) can be used for subcutaneous administration.

The Treatment of Syphilis.

Hefte 8 u. 9, 1891, of the *Wiener Klinik* contain the valuable work of Dr. Elsenberg on the treatment of syphilis. After discussing the curability of this disease, the question of re-infection, the results of the excision of the primary lesion, he comes to a consideration of the means at our disposal for the successful treatment. For the primary lesion, if phagedenic, the ordinary antiseptics are recommended: corrosive sublimate, carbolic acid, iodoform, derivatives of iodine. He recommends the method of inunction as the best of all for external use of mercury. He insists that a full warm bath which contains a pound of soda, the patient being well rubbed with soap, shall be taken for two or three days before treatment; that the teeth shall be put in order, and any inflammation of the mucous membrane of the mouth shall be treated by washes of 5 per cent. solution of salol dissolved in alcohol and well diluted with water. For inunction he advises the ordinary blue ointment popularized by Lebeuf, in doses from one-half to one and a half drachms. The time required for thorough inunction of the minimum quantity is upward of half an hour. This treatment is to be continued until all symptoms have disappeared, or eight or ten more treatments have been made, or there intervenes swelling of the oral mucous membrane. For six or eight weeks succeeding this treatment the iodide of soda or potash is to be employed. Although placing his reliance upon the inunction method, yet the author gives a very complete history of the various mercurials used for internal medication, as well as those used hypodermatically, both the soluble and insoluble salts.

In the administration of the iodides he prefers the iodide of potash, in doses sufficient to accomplish his purpose, even to one hundred and fifty grains *per diem*. The iodide of soda is to be substituted when potash is contra-indicated, because of the condition of the heart. In rare cases iodoform or odol (thirty to forty-five grains *per diem*) may be substituted.

[Although but little that is new is to be found in this monograph, yet the literature has been so thoroughly studied, the opinions of the clinicians discussed with so much fairness, the indications for treatment so clearly given, the methods to be employed so accurately described, that the careful perusal of this work will amply repay one who wishes to keep himself fully informed on the subject.—Ed.]

Creasote.

In the *Revue de Thérapeutique Médico-chirurgicale* for 1891, No. 18, p. 497, we find described the method of Dr. Legroux, who believes that creasote

is of great value in preventing the broncho-pneumonia which so frequently follows the operation of tracheotomy. He recommends a formula as follows:

Beechwood creasote, pure	ʒss.
Glycerin	ʒiij.
Rum	ʒv.

To be administered in doses of from two to four teaspoonfuls, according to the age of the child. The treatment is to be commenced as soon as it is suspected that the diphtheria has extended to the larynx, and it is of advantage to impregnate the broncho-pulmonary mucous membranes before the operation is performed, so that their resistance to infection may be increased, As soon as the operation is completed it is well to place over the external opening of the canula a thin layer of cotton moistened in a mixture of which the following is the formula:

Creasote	♏xv.
Alcohol	ʒijss.
Glycerin	ʒv.

The internal medication, using the creasote mixture, is to be continued. This treatment does not appear to be as successful if the broncho-pneumonia has set in before the operation.

Lavage.

In the same number, page 498, we find the method of Dr. Lienevitch, who proposes to relieve the vomiting which follows the administration of chloroform, by lavage. He believes that not only the chloroform, but as well the irritation of the peritoneum produced by the antiseptics, is accountable for this symptom. He employs the tube of Faucher and washes out the stomach with warm water in which ½ to 1 per cent. of bicarbonate of soda has been dissolved, until the water returns clear. The abdominal walls are compressed (after an operation of laparotomy has been performed) during the washing. The results are excellent, in that, if necessary, water sufficient for the needs of the patient can be left in the stomach. The general condition improves, because there is freedom from nausea, gaseous accumulations, vertigo, and epigastric distress.

Methyl-blue.

In the *Berliner klinische Wochenschrift*, No. 39, 1891, S. 953, Drs. Paul Guttman and P. Ehrlich give a valuable report of their investigations at the Moabit Hospital in Berlin. Taking the statement of Celli and Guarnieri, that the *plasmodium malariæ* was dyed by methyl-blue in fresh blood as well as in dry specimens, the authors set themselves at work to ascertain if this substance was of value in the treatment of malaria. Owing to the rarity of intermittent fever at Berlin but two cases are reported. The first patient suffered from the tertian variety and the diagnosis was undoubted, the temperature chart, condition of the spleen, and the presence of the plasmodium being confirmatory. On the evening of the day preceding the expected chill seven and one-half grains of methyl-blue were administered

Two hours after the dose there was slight strangury. During the night there were chilly sensations, a rise of temperature of about one and one-half degrees, with subsidence under gentle perspiration. Twelve hours after the administration of this dose the plasmodium was not dyed, nor indeed was there any change in the blood corpuscles. The same amount of methyl-blue was continued, but divided into five doses administered between noon and midnight. The chill did not again recur, and after the third day it was impossible to find plasmodia in the blood, and the spleen rapidly diminished to its normal size. In the second patient, suffering from the quotidian variety, an equally good result was obtained. This treatment must be continued for eight or ten days after the cessation of the fever. For the prevention of bladder irritation it is well to administer this medicament in powdered nutmeg (preferable to the ethereal oil, which is uncertain). Although the urine is increased in amount and deeply dyed, no albumin has been detected.

In Prof. Brieger's clinic methyl-blue has been used as a remedy for neuralgia (Dr. Robert Immerwahr, *Deutsche medicinische Wochenschrift*, 1891, No. 41, S. 1147.) Here the drug has been used in somewhat smaller doses, to one and one-half grains daily. Eight cases of unilateral sciatica were treated without benefit. Two patients suffering from facial neuralgia, three from angio-spastic migraine were speedily relieved. Several cases of purely nervous headache, of alcoholic depression (*vulgo*, "Katzenjammer"), were cured within an hour. Muscular rheumatism and the neuralgia of herpes zoster were greatly benefited.

Iodism.

Mr. F. W. Elsner, in the *Australian Medical Journal*, 1891, No. 8, p. 377, reports a fatal case of iodism. A woman, forty-nine years old, for four days had taken less than four grains of iodide of potash every six hours. She suffered from a severe coryza; vesicles, blebs, and bullæ appeared on her face, backs of hands and forearms; hemorrhages were found in the scalp. Vomiting of blood, bloody stools, œdema of the feet, hemorrhages confined to face, hands and scalp, were the marked symptoms before her death. "This case illustrates, what has often been urged, viz., that the small doses of iodide produce iodism most rapidly; but most authorities differ as to the dose, etc., which ought to be administered."

The Cutaneous Absorption of Drugs Incorporated in Fatty Substances.

M. L. Guinard has been carrying out some interesting experiments to ascertain—1st, if fatty substances, lard, vaselin, or lanolin, are absorbed by the unbroken skin; 2d, if cutaneous absorption is established, whether there exists any difference in the facts as regards absorption; 3d, if fatty absorption is not demonstrated, what excipient would yield more of the active drug incorporated in it. (*Lyon Médical*, 1891, No. 36, p. 6, and No. 37, p. 37.) The results are: Iodide of potash in lard, vaselin or lanolin, well rubbed in, is not absorbed. The same result was obtained with mercury, morphine, strychnine, and atropine. The conclusions are, that with man the absorption of drugs that are not irritant fails to take place through an unbroken skin, and that lanolin is not of more value than vaselin or lard.

Oxygen Inhalation in Cardiac Asthma.

In the *Centralblatt für die gesammte Therapie*, 1891, Heft 10, S. 578, Dr. M. Heitler relates his success in the inhalation of oxygen in a case of cardiac asthma dependent upon atheroma of the aorta. Treatment by morphine and ether injections not being satisfactory, with likewise a failure after administration of large quantities of alcohol, it was found that oxygen afforded relief. If there is, however, pulmonary œdema, ether injections are necessary.

Dangers of Creasote and Iodoform Injections.

In the *Journ. de Méd. de Paris*, 1891, No. 38, p. 429, M. Morel-Lavallée warns the profession that the subcutaneous administration of creasote and iodoform may be dangerous in tubercular patients. Practising injections of iodoform dissolved in olive oil, to which eucalyptol is added (method of Besnier), the author found in a case of cutaneous tuberculosis that there was a marked amelioration of the symptoms, but as the dose was steadily increased there was a dull-red halo about the site of the disease, and points of suppuration with excavation appeared. According to the observations of Besnier, precisely the same result may occur with creasote. This congestion could readily become dangerous in cases of pulmonary tuberculosis, so that, on account of the popularity of the treatment, this warning is timely.

Bites of Vipers.

Professor Kaufmann, of the Veterinary School of Alfort (*Lo Sperimentale*, 1891, No. 16, p. 352), has found permanganate of potash and chromic acid to be the best remedies against the bites of vipers. As soon as possible he places a ligature above the lesion, and then with a hypodermatic syringe injects deeply into the point of penetration two or three drops of a 1 per cent. solution. Three or four similar injections are made around this point. If there is swelling, injections are made into it, and the remedy diffused into the tissues by gentle pressure of the hand. Scarification, with compression, is the next procedure, then a protective dressing, dipped in the solution, after the surface has been thoroughly cleansed with it. Small and frequently repeated doses of ammonia and alcohol should be administered to keep up persistent stimulation.

The Treatment of Erysipelas.

Dr. Stanislaus Klein, in the *Berliner klinische Wochenschrift*, 1891, No. 39, S. 958, presents a very valuable contribution from the clinic of Professor Stolnikow, in Warsaw. Quoting Fessler's observation that ammonia ichthyol in bouillon, one to four thousand, prevented the growth of streptococci, and that soda ichthyol in weaker solution hindered the growth of streptococci, and, to a less degree, that of the staplylococcus aureus, he presents his conclusions based upon the experience of two years.

The method which is employed is as follows: The diseased surface is cleansed by washing with soap and water (or with concentrated aqueous solu-

tion of carbolic acid, Fessler), and an ointment of equal parts of vaselin and ichthyol, or of equal parts of ichthyol, water, and lanolin, thoroughly rubbed in with the hand over the area of disease, and for a distance of a hand-breadth around it. Over the anointed surface a thin layer of salicylic acid cotton dressing, covered by a thick layer of absorbent cotton, is applied. This is reapplied two or three times daily until the temperature has been normal for three or four days. He concludes that ichthyol is beneficial by its reducing action on the tissues, or by its influence upon the microörganisms, or by both together; that it shortens the duration of the disease one-half; that the duration of treatment is three or four days, and that the course of the disease is much milder.

The following articles are worthy of note:

"Salol," by M. ED. ÉGASSE, in the *Bulletin Gén. de Thérapeutique*, 1891, No. 36, p. 241, is an excellent study of salol, dealing with its chemistry, physiology, and therapeutics. Its value in the diagnosis of diseases of the stomach and pancreas is clearly stated, and its very great usefulness as an intestinal antiseptic duly set forth.

DOTT-DOMENICO MARINUCCI, in *La Riforma Medica*, 1891, No. 218, p. 803, presents the results of his investigations in "Sterilization of Drugs for Hypodermatic Use." The problems were—1st. Do these solutions contain living germs? 2d. In sterilization is their therapeutic value changed or lost? Conclusions: All solutions studied can develop organisms, although probably not all harmful; in sterilization by heat, strychnine, curarine, bichloride of quinine and borate of eserine are unchanged; with morphine and atropine the dose after sterilization must be increased; sulphate of eserine markedly changed. Since heat changes atropine and sulphate of eserine these drugs are best sterilized by a sublimate solution, 1:10,000, renewed every two weeks.

DR. R. DUBOIS presents an interesting theory, to account for the "Action of Anæsthetics" (*Revue Générale des Sciences*, 1891, No. 17, p. 563). Recounting the effects of anæsthetics on vegetation, quoting the experiments of Bernard and Javal and the curious studies of Graham, he believes the mechanism of the action of anæsthetics is really a dehydration of the protoplasm, which does not, however, produce any change of structure recognizable by our ordinary methods of investigation.

COCAINE.

In *La Médecine Moderne*, 1891, No. 37, p. 653, PROF. G. SÉE furnishes us with a short and practical statement concerning the cocainization of internal organs. As a remedy for pain, it is inferior to injections of morphine or antipyrine, and presents many more inconveniences. In diseases of the stomach it fails, although less dangerous when administered by the mouth than hypodermatically. It is not prophylactic against fatigue. As an antidote to the morphine habit "it is not a triumph but a martyrization of the human race." Acute cocaine poisoning is difficult to foresee, the poisonous dose being so variable and the conditions not easily determined. The vaso-constriction produced by cocaine may be combated by nitrite of amyl, which is often without effect, while chloral is still more uncertain.

MEDICINE.

UNDER THE CHARGE OF

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The Diuretic Action of Fresh Thyroid Juice.

A year ago, E. Hurry Fenwick (London) found that on rubbing the glairy juice from the cut surface of a fresh sheep's thyroid into the subcutaneous tissue of a myxœdema patient, at the request of Dr. Sansom, the quantity of urine passed by the patient rose from twenty to fifty ounces on the following day. Since then he has made hypodermic injections of the fresh juice mixed with an equal quantity of distilled water, with striking results. About twenty drops of the mixture are injected into the subcutaneous tissue of the arm, or over the shoulder-blade, with a Koch's syringe. Some pain and slight swelling are sometimes complained of, but toxic symptoms such as have been described by Ewald have not been encountered. The urine increases in amount during the next day or the day after, and the effect in the myxœdema case continued for fourteen to twenty-one days.—*British Medical Journal*, 1891, No. 1606.

Salicylate of Sodium in the Treatment of Diabetes.

Dr. E. Mansel Sympson (Lincoln) records a case of acute saccharine diabetes in a youth, aged seventeen years, in which marked improvement took place under sodium salicylate. When first seen, on April 18th, he presented the usual symptoms in a marked degree, and was passing seven pints of sugary urine (specific gravity 1050) in the twenty-four hours. On a mixed (though partly restricted) diet and ten grains of salicylate every four hours, at the end of a week the daily quantity of urine had diminished by two pints. During the second week he was put on strict diet, and had salicylate every six hours. On the twelfth day of treatment he was passing two pints of urine daily, of specific gravity 1014, with a trace of sugar (less than one grain to the ounce). On the eighteenth day sugar had disappeared from the urine. Meanwhile the symptoms gradually subsided, and he gained weight rapidly. On two occasions, when the drug was temporarily suspended, the amount of urine passed was doubled in quantity. The blood presented no abnormalities, and the motions did not contain fatty matter. In July the patient was well and healthy-looking, and able to take plenty of exercise. The author discusses at some length the action of sodium salicylate, and indorses the view of Haig that it may do good in the neurogenic form—that

due to vascular eccentricities of the liver—by promoting the excretion of uric acid, so as to lessen irritation of the vascular system of the liver and consequent abnormal transformation of glycogen into glucose. He further draws attention to the large number of cases of diabetes in which post-mortem evidence of disease of the pancreas is met with, and quotes recent experiments which would tend to show that the pancreas secretes a ferment capable of transforming the glucose in the blood. In view of the many reports given of obstructed ducts and of atrophy and degeneration of the gland itself in fatal diabetes, these experiments, if confirmed, would clear up the pathological difficulty.

"There is one rather weak link at present in the chain of argument—namely, that this glycogenic ferment has not yet been isolated.[1] It probably is poured out into the portal vein (if it went into the duct it would be neutralized by the glucose-forming ferment already present there), and carried thereby to the liver. As long as there is a normal supply there, it keeps carbohydrate material in hand as glycogen. When, either from too great blood-supply to the liver (which will expose the glycogen to the action of the glucose-forming ferment in the blood) or from failure of the pancreatic secretion, the sugar formed by digestion passes into the blood—and, moreover, as there is no restraining influence—the glycogen already formed in the liver is converted into sugar, and diabetes mellitus is the result. Then it becomes a very interesting question as to whether many of the more acute cases, occurring in youthful patients, may not be really due to pancreatic disease; the severity and the issue will depend on the cause of that pancreatic disease. This suggests at once the treatment, which has been carried out with some success, of giving these patients liquor pancreaticus, calves' sweetbreads, etc. Finally, if salicylate of sodium does any good in these cases, I would suggest that it stimulates the pancreatic gland, just as it certainly does good to nursing mothers by stimulating the mammary gland. Again, as it makes the bile more watery and less likely to form gall-stones, so with much probability it does the pancreatic juice."—*Practitioner*, No. 278, 1891.

Pulsating Empyema.

Dr. E. M. Light (Leeds) records three cases of this affection.

In the first case, a boy, aged four years, the whole left chest was absolutely dull. There were two localized swellings—an anterior one over the fifth, sixth, and seventh ribs, in which pulsation was most marked, and a posterior, less prominent one over the ninth, tenth, and eleventh ribs in the line of the scapular angle; in this the pulsation—synchronous with the heart-beats—was only apparent when the child lay on his right side. Thirty ounces of pus were evacuated, and the child made a complete recovery.

In the second case, a child, aged three years, there were all the signs of fluid in the left pleura and œdema of chest-wall. There were two distinct swellings—one over the præcordia, and the other over the eighth interspace in the mid-axillary line, which was red, glazed, and fluctuating. This latter

[1] The various experiments made by the writer in this direction have not been successful, perhaps for the reason given immediately as to its being sent into the portal vein.

swelling pulsated visibly, synchronous with the cardiac impulse and systolic in time. Twenty-five ounces of pus were evacuated. Subsequently persistent vomiting set in, and death occurred a fortnight later. Post-mortem there was evidence of right pleurisy and recent general peritonitis. No tubercle. Complete collapse of left lung.

The third case was a man, aged twenty, admitted with signs of large, left pleural effusion. Had been tapped a few weeks previously. Over the left fourth and fifth ribs, about one inch within the nipple line, was a glossy fluctuating and pulsating swelling. Eighty ounces of sweet pus were slowly evacuated, but the patient died soon after the operation. Post-mortem the left lung was completely collapsed and much compressed. The pericardium was adherent to the left pleura, and contained eight ounces of clear fluid. No tubercle.

All three cases presented the usual signs of pulsating empyema (pulsating empyema necessitatis). The production of pulsations necessitates a concourse of circumstances which are not commonly found in the same patient. The empyema represents a vast cavity, closed in all parts and full of fluid, which possesses a certain tension, compressing and displacing the heart to the right of the middle line of the sternum. The heart in contracting reacts against this compression, pushing back more or less strongly that part of the pleura which corresponds to the ventricular mass, and which is adherent intimately to the pericardium. The pleural sac of a left-sided effusion is in connection with the left ventricle, whereas a right-sided effusion would have its pleural sac more in connection with the right auricle and base of the right ventricle; hence, perhaps, one of the causes of the greater frequency of left-sided pulsating empyemata.

Further, the liquid effusion must possess a certain tension and exercise a compression on the heart itself, for the evacuation of a certain quantity of fluid in diminishing the tension of the effusion weakens, and even entirely suppresses, the pulsation. In order that the impulse communicated to the whole surface of the empyema may become appreciable to the exterior, it is necessary that there should exist a point of least resistance such as is afforded by the walls of external abscesses.

The condition is usually met with in empyemas of chronic character, hence the prognosis is less favorable than in cases recognized early, as chronicity is always a serious element in prognosis.—*Lancet*, 1891, No. 3552.

Crises of the Digestive Tract in Graves's Disease.

Mr. A. Mande (Westerham) directs attention to the diarrhœa and vomiting of this malady. Both are common symptoms. Four out of nine cases under his care in 1890–91 presented crises in a typical form. The diarrhœa is paroxysmal, and has been likened by Charcot to the gastric crises of tabes dorsalis. It sets in at any time, usually in the morning, without any warning. The patient has an urgent call to the closet, and passes a huge liquid motion without any pain or colic. The stools are serous, and generally light-colored. After a few days the attack ceases suddenly, to recur after an interval of days, weeks, or months. In one case the attacks were accompanied by pyrexia, and one of the attacks which occurred away from home was pro-

nounced to be typhoid fever. No definite relation could be established in any of the cases between the diarrhœa and the pyrexia of Graves's disease. Ordinary treatment appeared to avail little or nothing.—*Practitioner*, 1891, No. 279.

Suppurating Hydatid of the Liver Simulating Gall-stones; Rupture through the Lung.

Dr. C. H. Cattle (Nottingham) records the following case: A married woman, aged fifty-six, was suddenly seized with vomiting, which was followed by an attack of jaundice. Previous health had been fair. She did not recover her usual health after this, and a month later the left lobe of the liver was found considerably enlarged downward, and subsequently a gradual progressive extension of liver dulness both downward and upward was noted. About the eighth week a succession of attacks of severe pain in the hepatic region commenced, attended by rigors, vomiting, perspiration, moderate pyrexia, and transient jaundice. There was now dulness over the right lung behind, as high as the middle of the scapula. About the thirteenth week the patient began to expectorate pus, which gradually became offensive, and a few days later physical signs of excavation were present below the right nipple. The lung was incised, and several ounces of thin pus with numerous grape-like cysts containing hooklets were evacuated. The patient only survived two days, and no post-mortem was made. In the writer's opinion a more successful result might have followed bold and timely resort to surgical measures.—*Lancet*, 1891, No. 3554.

Syphilis and Gastric Ulcer.

Dr. J. Keser (London) records the case of a barmaid, aged nineteen, who was admitted to hospital with symptoms of gastric ulcer, with frequent slight hæmatemesis. For the first ten weeks all treatment appeared to be of little or no avail. At this period definite evidence of syphilis—condylomata and mucous patches on the tonsils—was obtained, and the patient discovered to be four months pregnant. Under mercury the gastric symptoms speedily improved, and the sickness and hæmatemesis shortly ceased. The patient miscarried a few weeks later, and made a complete recovery.—*British Medical Journal*, 1891, No. 1604.

Hysteria in a Child, Six Years Old, after Influenza.

The patient was under the care of Dr. T. C. Bailton, of Manchester. Personal and family history both good. She had influenza severely in May, with predominance of nervous symptoms, followed by protracted convalescence. She had neither walked nor spoken since the onset of the disease (five weeks). On admission she was apathetic, but conscious. No signs of visceral disease. No motor paralysis, but wavy, clonic spasm of arms when extended. Whines continually, but never speaks. Four days later she was made to sit up in bed. Moves head from side to side, and looks idiotic. There is complete analgesia to pin-pricks of all parts of the body. When lifted out of bed she holds the legs rigid at right angles to the trunk. Under treament by cold baths and faradization she made a perfect recovery in less than two months.—*Lancet*, 1891, No. 3554.

Intra-venous Inoculation of the Bacillus of Typhoid Fever.

Welch (*Bulletin of the Johns Hopkins Hospital*, ii. 15, 1891) has recorded an observation in which a rabbit that survived an injection into a vein of the ear of a bouillon culture of the bacillus of typhoid fever, died one hundred and twenty-eight days subsequently, in less than eighteen hours after a subcutaneous inoculation of a culture of the bacillus of swine-plague. At the autopsy, bacilli of swine-plague were found in the blood and organs. The gall-bladder, however, was small and contracted; its walls were grayish-white, opaque, and thickened; its contents being a turbid-gray, rather creamy fluid, in which no bile-pigment could be found. The walls of the common bile-duct were also thickened and contained turbid-gray matter. Microscopical examination of cover-glass preparations made with the fluid found in the gall-bladder and bile-duct disclosed the presence of the bacilli of typhoid fever, the identity of which was established by cultures.

The Histological Changes in Experimental Diphtheria.

Welch (*Bulletin of the Johns Hopkins Hospital*, ii. 15, 1891) records the histological changes found in the organs of guinea-pigs, rabbits, and kittens that died at periods of from thirty-eight hours to eight and one-half days after receiving subcutaneous inoculations of pure cultures of the Klebs-Löffler bacillus obtained from undoubted cases of primary diphtheria. At the seat of inoculation a grayish, necrotic, pseudo-membranous focus developed, which was surrounded by a red zone of varying size; the subjacent muscle was greatly congested; the adjacent subcutaneous connective tissue was œdematous, and presented a gelatinous appearance; neighboring lymph-glands were enlarged. The peritoneal cavity contained an excess of fluid; the layers of the peritoneum were injected, and in some cases were the seats of ecchymoses. The liver was congested, in some cases fatty. In some cases the spleen was enlarged. The kidneys were moist and hyperæmic. The adrenals were congested, and in many instances hemorrhagic. The agminated glands of the intestine were abnormally prominent, and exhibited a number of whitish spots imbedded in a grayish material. In many cases the pleural cavity contained an excess of fluid. The mediastinal and bronchial glands were swollen and reddened. The heart appeared normal, while the lungs sometimes presented areas of congestion or of consolidation. The deep cervical glands were commonly reddened. The thyroid was uniformly congested, sometimes hemorrhagic. Bacilli of diphtheria were found at the seat of inoculation, both free and within leucocytes. Many of the leucocytes presented fragmentation of their nuclei. The local action of the bacilli is most intense. Not only the leucocytes, but the fixed cells and the nuclei of connective tissue and of muscle also suffer. There were hemorrhages beneath the capsules and into the substance of the affected lymph-glands. The bloodvessels contained a greatly increased number of leucocytes. The number, character, size, staining capacity, and configuration of the nuclei of the cells of the glands were greatly altered, principally in the lymph-follicles, in less degree in the lymph-cords and lymph-sinuses. Similar alterations were found throughout the lymphatic structures of the body: in the spleen, mesenteric, retro-peritoneal,

bronchial, mediastinal, and cervical glands, and intestinal lymphatic apparatus (Peyer's patches, solitary follicles and diffused lymphatic tissue). Degenerative changes were found in the liver. Hemorrhages under the capsule and in the subjacent lobules were common. The intra-lobular hemorrhages resulted from breaches in the continuity of the walls of the central veins, which had become hyaline. Fatty changes were found in the epithelium of the tubes and glomeruli of the kidneys. Hyaline alterations were present in the smaller vessels. There were hemorrhages beneath the pleura and into the alveoli, with an exudation of leucocytes and fibrin into some. The heart was the seat of varying degrees of fatty degeneration. Cultures made from the blood, liver, kidney, and spleen were negative.

The Specific Gravity of the Blood in Health and in Disease.

As a result of a series of fifty-four observations in conditions of great diversity, Siegl (*Wiener klin. Wochenschr.*, iv. 33, 1891) has arrived at the following conclusions:

1. The specific gravity of the blood is dependent upon the proportion of hæmoglobin and is independent of the number of blood-cells.

2. Diseases, acute as well as chronic, only affect the specific gravity of the blood when they have led to gradual prostration. Rapid loss of strength, on the contrary, appears to exert but little influence. In the course of diseases in which the blood is contaminated by the products of pathological tissue-metamorphosis, or in which the blood is deficient in its normal chemical constituents, there is, in addition to an absolute change in the specific gravity, a disproportion between the specific gravity and the percentage of hæmoglobin. In hepatogenous jaundice, in diseases of the lungs or of the heart attended with cyanosis, in diseases atttended with loss of bodily fluids, the specific gravity is (relatively to the percentage of hæmoglobin) raised. When the blood is deprived of albumin as a result of albuminuria, and probably of long-continued suppurative processes, the specific gravity is lowered. In renal disease the quantity of urine and the degree of albuminuria will in each case indicate how far hydræmia or hypalbuminosis is responsible for the abnormal specific gravity.

3. In cases of anæmia, in which there is no organic disease that exerts an influence upon the specific gravity of the blood, this constitutes an index of improvement or of progression as regards the anæmia.

The Toxicity of the Urine.

Prompted by the view that various toxic products are eliminated in the urine in acute infectious diseases, Semmola (*La Union Méd.*, xlv. 95, 1891), before the Académie de Médecine expressed the thought that, by the injection of such urine in rabbits and guinea-pigs, the symptoms of the original disease would be reproduced. Such a procedure would constitute a valuable diagnostic aid. Thus, for instance, in a case of influenza-pneumonia, complicated by tetanic and eclamptic attacks, the injection of the urine should reproduce the symptoms in animals, and meningitis could be excluded.

Purulent Pleurisy.

Courtois-Suffit has made a study of the subject of purulent pleurisy, and presents certain facts of practical importance. Bacteriological research has revealed the existence of several varieties of purulent pleurisy, the etiology, symptoms, course, prognosis, and treatment of which differ with the active infectious agent. Three main groups may be recognized: 1, pleurisy due to the pneumonia-coccus of Fränkel; 2, that due to streptococci; 3, that due to the bacillus tuberculosis. In addition, there may be the following mixed forms: 1, pleurisy due to pneumonia-cocci and streptococci; 2, that due to streptococci and staphylococci; 3, that due to the bacilli of tuberculosis and streptococci; 4, putrid and gangrenous empyemata, caused by the microbes of suppuration associated with certain saprogenic organisms. There are, besides, rare forms of purulent pleurisy due to the bacillus of Friedländer, to the staphylococcus pyogenes, and to the bacillus of Eberth. In the pleurisy due to pneumonia-cocci—metapneumonic pleurisy—the pus is thick, greenish, creamy, without odor; the pleura is covered with false membrane, shreds of which may float in the effusion; the pleurisy has a tendency to become encysted; it often terminates in a vomica, and rarely becomes chronic; it may be primary, associated or not with other pathological conditions due to the pneumonia-coccus, in which case its onset is sudden; or it may appear insidiously in the course of a pneumonia or suddenly during defervescence; the temperature is that of a continued fever, without oscillations or irregularities; the effusion is copious in the acute primary form, moderate in the latent; the pleurisy terminates by absorption or by the formation of an encysted vomica; the prognosis is favorable; the mortality does not exceed five or ten per cent.; in this form, especially, is simple puncture justifiable. Purulent pleurisy due to streptococci may develop in the course of a constitutional affection caused by the same organisms as puerperal fever; in connection with other pathological conditions arising from infection by streptococci, as broncho-pneumonia and peritonitis, and secondarily to remote affections, as an otitis or a phlegmon: the pus is thin, yellowish, without odor, flocculent, and shows no tendency to become encysted. Occurring in the course of another affection the pleurisy is latent and insidious; appearing at the termination it may be acute, frank, and painful; its evolution is slower than in the case of pleurisy due to pneumonia-cocci; the temperature is that of suppuration due to streptococci, with decided remissions and exacerbations; the effusion, usually moderate in degree, never yields to simple puncture; it shows no tendency to absorption or spontaneous evacuation, and only exceptionally gives rise to vomicæ; death may occur from septicæmia or purulent infection; the duration is long; the mortality about twenty-five per cent.; early and radical operative interference is necessary. The bacillus tuberculosis alone may occasion a purulent pleurisy, comparable to a cold abscess; the pus is thin, yellowish, opaque, without odor and flakes of fibrin; the pleura is thickened by many layers of superimposed plastic exudate, containing tuberculous nodules; the pleurisy may set in frankly and acutely, or may be insidious and latent, the patient sometimes remaining unconscious of the presence of the effusion, though this be abundant; during the active stage the general health may be preserved, febrile reaction may be absent, and the

fluid slowly but persistently reaccumulates; a fatal result occurs sooner or later, according to the course of the pulmonary disease; repeated puncture is necessary. In the purulent pleurisies due to mixed infection the condition assumes the gravity occasioned by the most virulent microbe. The association of streptococci and staphylococci gives rise to a pleurisy of grave type, insidious onset, irregular course, with the signs of pyæmia and wide range of temperature; early and energetic treatment by means of incision and lavage is required. Pleurisy from streptococci may be a complication of pulmonary tuberculosis; although curable it may prove a serious complication, necessitating, perhaps, the operation for empyema. The pleurisy occasioned by the microbes of suppuration is especially grave when pulmonary cavities exist; the prognosis is then almost fatal. The putrid and gangrenous pleurisy rapidly gives rise to the grave general manifestations of sapræmia, it necessitates speedy and energetic intervention.—*Gazette Méd. de Paris*, No. 12, 1891.

Defective Inter-ventricular Septum Without Cyanosis.

Wilbouschewitch (*Bulletins de la Soc. Anat. de Paris*, 1891, No. 2) reports the case of a seamstress, twenty-five years of age, with a tuberculous family history. The patient had been uninterruptedly at work, when suddenly a copious hæmoptysis took place. She was pale and thin. The chest was small and flat; the vertebral column kyphotic. The percussion note was dull and the respiratory murmur feeble over the upper third of the left lung. Râles and friction-sounds were heard, in greater number on the right. There was little cough and expectoration. At the apex of the heart both a presystolic and a systolic murmur were heard and a purring tremor felt. Duplication of the second sound was heard at the base. A second copious hæmoptysis in the course of a few days, was followed by death. At the autopsy pleural adhesions were found, and the lungs contained many tubercles and some cavities. The heart was relatively large; the vessels were given off normally; the mitral orifice admitted two fingers. The inter-ventricular septum was defective at its upper part, and by the foramen thus formed the ventricles communicated; the opening was oval, slightly elongated transversely, and about as large as a two-franc piece; the lower portion of the septum was thickened, its upper free border was smooth; a thin band of muscular tissue intervened between the abnormal opening and the aorta; the mitral and tricuspid leaflets came in contact; a tendon of a leaflet of the tricuspid valve was inserted into the free border of the opening, before which the left tricuspid leaflet was stretched like a curtain. The pulmonary artery was dilated; the vessel bifurcated just above the valve; its branches in the lung were also dilated. Upon the endocardium of the right side of the heart and of the branches of the pulmonary artery were numerous patches and lines, probably the evidences of a fœtal endocarditis. During the ventricular systole the defect in the septum had apparently been partially closed by the tricuspid valve, preventing the admixture of venous and arterial blood and the production of cyanosis.

SURGERY.

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SKEWER AMPUTATION OF THE ENTIRE UPPER EXTREMITY.

McLEOD (*Lancet*, No. 3, vol. ii., 1891) reports a case in which a very large tumor was successfully removed, the hemorrhage being checked by a combination of skewers and an elastic cord. The patient on whom the operation was performed was suffering from a large globular tumor of three months' standing, placed beneath the right deltoid muscle, which was tightly stretched over it. The circumference of the limb at the shoulder was nineteen inches. The acromion process could not be felt. The entire axillary space was filled. The scapula was evidently implicated, and no movement existed at the shoulder-joint, the scapula and clavicle moving with the tumor. The outer end of the clavicle was lost in the mass. The overlying skin was not infiltrated or broken. This growth was evidently a sarcoma.

After chloroforming the patient, two punctures were made, one in the floor of the axilla, and the other a little above and behind the top of the shoulder. A stout packing-needle, about eighteen inches long, was passed from below upward through the cavity of the axilla, behind the vessels and nerves, within the girdle of the shoulder bones, and, finally, was made to emerge through the second puncture. A second needle of the same size was entered at the lower puncture, directed transversely beneath the scapula, and made to emerge behind the posterior or vertebral border of the bone. A strong India-rubber cord was wound, figure-of-8 fashion, around the projecting ends of these needles, encircling the part with a tight elastic loop, which was held in position by these skewers. A circular incision was now made about two inches to the distal aspect of these loops. The clavicle was divided at the junction of the middle and outer third, thus exposing the plexus and vessels; the latter were isolated, and a clamp forceps was put on them for additional security. The attachments of the scapula were then rapidly divided and the extremity was removed. The axillary artery was then secured, the elastic cord gradually loosened, and the vessels as they spurted were secured. The patient was severely shocked, but made a prompt recovery.

THE TECHNIQUE OF GASTROSTOMY.

WITZEL (*Centralblatt f. Chirur.*, No. 32, 1891) has devised an ingenious method of gastrostomy, for the purpose of preventing the escape of gastric

contents and the attendant inconveniences. Trial upon two cases has given good results.

His procedure consists in forming a canal passing obliquely from left to right, by means of sewing together the free borders of two parallel folds of the stomach-wall. This canal leads to a small opening in the stomach, which allows the tube to enter the cavity of the latter viscus in very much the same way that a ureter enters the bladder. To perform this operation a sufficient portion of the stomach-wall is drawn out of the abdominal wound. This is always readily accomplished by steady, gentle traction. Two folds of the stomach are made, parallel to each other, running obliquely from left to right. Lembert sutures are now inserted passing through the crests of the two folds and over a rubber tube about as large as a lead-pencil. An opening just large enough to introduce the tube is made at the extremity of the furrow, the Lembert sutures are drawn tight, converting this furrow into a canal. The stomach-wall is secured to the parietal wound in the ordinary manner, and the tube is brought through the external opening.

One and a half inches is sufficient length for the canal made by suturing together the double folds of the stomach. The fistula thus made is readily kept closed by a small tampon, and in the two instances in which this operation was performed by the reporter there was never any leakage of the stomach contents.

Removal of an Extensive Epithelioma.

Terrier (*Bull. de l'Acad.*, 3e sér., tome xxvi.) operated upon a case presenting a tumefaction of the frontal region. Sarcoma was suspected and exploratory puncture showed the malignant nature of the growth. The greater portion of the frontal bone was involved, together with the dura mater underlying it. The superior longitudinal sinus was ligated in two places, and resected between the ligatures. The left frontal sinus was also invaded by the malignant growth. All the diseased tissue was removed, and to avoid infection of the entire wound from the mucous cavity this part of the wound was packed with iodoform gauze. This packing was not removed until the remainder of the wound was completely healed. Cure was complete.

Microscopic examination showed that the tumor was an epithelioma.

Successful Treatment of a Punctured Orbital Wound of the Brain.

Punctured wounds of the brain through the orbit are attended with such a large mortality that the report of a successful case is always of interest. Polaillon (*Bull. de l'Acad. de Méd.*, 3e sér., tome xxxvi.) had brought into his ward a man into whose left orbit the point of an umbrella was driven so firmly that it was with some difficulty extracted. The patient entered supporting the umbrella with his hands. As it was drawn out by the assistant the crackling of bones was distinctly perceived. Its extremity had penetrated to the depth of two inches, passing upward and outward toward the roof of the orbit. Shortly coma, stertorous respiration, and a weak, intermittent pulse developed.

A large plate of the frontal bone was removed about the size of a silver

dollar. The frontal sinus, which was very feebly developed, was not opened. The dura bulged through into this opening, so that the finger could not be entered for the purpose of exploring. The dura was incised, allowing some blood and cerebro-spinal fluid to escape. By means of the finger the opening into the roof of the orbit was readily found. This was placed far back near the lesser wing of the sphenoid. Five splinters of bone were removed, together with a certain quantity of cerebral matter, and a spouting cerebral artery was secured. The remains of the punctured eye were enucleated, the orbit was thoroughly cleaned out, and a drainage-tube was carried from the trephine opening through the supra-orbital plate and out at the orbit.

In a few hours following the operation the patient regained consciousness, and dangerous symptoms disappeared. The next day the drainage-tube traversing the punctured wound was replaced by two tubes, one passed through the trephine opening, the other through the orbit.

On the eighth day the frontal drain was removed, on the twelfth the orbital drain. The patient completely recovered.

Treatment of Surgical Tuberculosis by Injections of Chloride of Zinc.

Lannelongue (*Journ. de Chir.*, tome xlii., 15 cah.), upon the observed fact that chloride of zinc injected into peri-tubercular tissues produces sclerosis and thereby renders such tissues unfit for the development of tubercle bacilli, advises the injection of this medicament into tissues immediately surrounding tubercular neoplasms, particularly in the regions through which pass the bloodvessels supplying the tubercular tissue. He ordinarily employs a 10 per cent. solution of chloride of zinc. This solution should not be injected into the cavity of an articulation, but rather into those regions from which the diseased synovia receives vascular supply—that is, immediately beneath the periosteum in the regions of synovial reflection. The fungosities found growing along the course of the ligaments should also receive attention. It is better to avoid the arteries, though in two cases where these were entered no bad effect seemed to follow. The injection should not be made immediately beneath the skin, but rather in the most superficial layer of the fungosity, and by preference at the points of reflection. The points of election for the injection are upon the bones, the ligaments, and the tendons. With a 10 per cent. solution there is violent local reaction, but if the injections are made sufficiently deep destruction of the skin is rare. Even should this occur it does not seriously compromise the case. Tubercular adenitis is amenable to this treatment. Where there are no foci of caseation injections in the periphery of the ganglia and upon the surface of these tumors produce a prompt diminution in the swelling. When caseation has taken place the treatment causes abscess, in which case there should be a free opening, abundant washing with sterilized water, and peripheral injections of chloride of zinc. It is best to inject small quantities—two drops, for example—and to make multiple injections.

Of 22 cases treated by zinc injection all have shown great improvement. In some this is so marked that they can be considered cured. Absolute cure depends upon the disappearance of the bacillus; that this takes place is not

yet proven; but even should this microörganism persist, isolation by fibrous tissue would tend to render it harmless.

Laparotomy for Contusion of the Abdomen.

Lane (*Medical Press*, No. 2728), from an experience of three cases, concludes that in cases of extensive rupture of the spleen or enlarged mesenteric vessels a fatal quantity of blood is lost within a very short time, probably within ten minutes, and that after this very little blood escapes, unless stimulants are used. From this it is obvious that surgical interference, even though adopted as early as possible, is not likely to be successful unless transfusion of blood be performed at the same time. His first case was injured by being pinned against a wall by the pole of a wagon striking against the abdomen. The patient was collapsed and suffered great pain in the abdomen, which was tender and rigid. No blood was vomited. The operation was performed in two hours. Blood and fluid feces escaped from the abdominal cavity, and a loop of small intestine was found perforated in two places, about eighteen inches apart. The mesentery corresponding to the loop presented at its attachment to the spine a hole so large that four fingers could be passed through it.

Two feet of intestines were resected. In a further search for damage the patient was eviscerated. Proximal and distal ends of the bowel were then brought together with Senn's approximation plates. The patient died the second day, apparently from exhaustion. The second and third cases were run over. In each instance the spleen was torn and the abdominal cavity was filled with blood. Death followed very shortly after operation.

Mental Symptoms after Surgical Operations.

Kiernan (*The Medical Standard*, vol. x., No. 3) cites a formidable list of authorities from Ambrose Paré to Horatio Wood, showing the profound nervous effect produced by operation. He has found 186 cases of profound mental change following operation; 35 cases after operation for cataract; 65 following gynecological operations, and the remainder resulting from plastic operations, amputations, manipulations, etc. In 15 cases there was larvated epilepsy precedent to the operation; in 10 hysteria major was present; in 30 cases a neurotic element existed; in 35 cases the patients had arrived at periods of involution when instability of the nervous system usually results. In 10 cases only was the influence of blood-poisoning demonstrated.

The acute types of mental affection following operation are aptly designated as "acute confusional insanity." In the larvated epileptic cases, the neurotic, and the hysterical, the prognosis is good. In some of the cases occurring at periods of involution senile degenerations are precipitated. The majority of blood-poisoning cases died. Typho-mania is sometimes observed.

The moral treatment of the patient precedent to the operation is the best prophylaxis. If to the dread of the operation be added dread of the operator the nervous perturbation will necessarily be far greater. Sedatives and other measures tending to calm agitation are necessary. Quinine is

strongly indicated. Opium and not chloral hydrate or the bromides will, as a rule, be found a most valuable aid in most of the cases. In many of the hysterical cases salix nigra and monobromate of camphor give good results.

Resection of the Second and Third Divisions of the Fifth Nerve at the Foramen Rotundum and Foramen Ovale.

In reporting two cases of resection of the fifth nerve at the foramen rotundum and foramen ovale, Mixter (*Boston Medical and Surgical Journal*, vol. cxxv., No. 7) makes some pertinent remarks in regard to the best method of reaching these nerve-trunks at their points of exit from the skull.

The first step in the operation consists in turning down a flap with the temporal muscle, zygoma, and pterygoid. The hemorrhage is always severe, and is only controlled by packing with sponges, and by compression with spatulæ. When the external pterygoid plate is reached, the soft parts are pushed back with the finger or blunt instruments. As a general rule, there is a sufficient space to admit the end of the index finger between the posterior border of the internal pterygoid plate and the spinous process. Between these bony points there is sometimes a bridge of osseous tissue replacing the ligamentous structure which normally lies here. If, on reaching the external pterygoid plate, the space between it and the spinous process is very small, or there is a bony bridge between these points, it is necessary either to use a chisel and cut through the obstruction, or to break it away with a blunt instrument until the finger passes readily to the foramen ovale, which is recognized by touch. By separating the attachment of the external pterygoid muscle from the external plate until the pterygo-maxillary fissure is reached the internal maxillary artery is exposed and may be readily tied. Then, in most cases, the second branch of the fifth pair can be drawn out as it emerges from the foramen rotundum by means of a blunt hook, when it may be seized with strong hæmostatic forceps and divided by means of a curved tenotome at its exit from the foramen. By means of the hæmostatic forceps the branches of the nerve are twisted out. In some cases a marked projection at the anterior end of the pterygoid ridge prevents easy access to the spheno-maxillary fossa; in this case the projection should be removed by means of a chisel. The three cases reported all made prompt recovery.

Spinal Surgery.

In the address on this subject delivered before the American Surgical Association, at the Congress of American Physicians and Surgeons, held in Washington in September (*Therapeutic Gazette*, October, 1891), Dr. J. William White limited his discussion of the surgery of the spine to the conditions requiring operative interference, or to those in which operation may reasonably be considered, and excluded lateral curvature, the so-called "railway spine," etc., since some of these conditions belong to the province of the orthopædist, others to that of the neurologist.

He classifies those remaining as follows:

A. Congenital deformities.

B. Tuberculosis of the spine.

C. Neoplasms.

D. Traumatisms.

A. Under the first heading, spina bifida is the only condition which is at once of sufficient frequency and sufficient importance to demand special consideration. After reviewing the general subject, Dr. White expresses himself as in accord with the conclusion arrived at by the committee of the Clinical Society of London, and held by the majority of surgeons at the present day. This is, that while various successes have been reported by other methods, such as simple tapping and drainage, and more recently in a limited number of cases by excision of the sac, yet, on the whole, the method of injection of the sac offers the best prospect of ultimate recovery with the least immediate danger.

B. In the second group of cases, which includes the various forms of tuberculosis of the spine, the indications for operative interference may be: 1, the evacuation of pus; 2, the removal of a sequestrum or of the focus of carious bone; 3, the relief of the cord from pressure by pus, bone, or, more commonly, by the products of a simple or tuberculous external pachymeningitis. These indications may coexist or may be quite distinct.

In disease of the bodies of the vertebræ, the most accessible region is without doubt the lumbar, and the now well-known operative procedure of Treves may be adopted as the best. It makes the body of the twelfth dorsal vertebra safely accessible. The existence of a psoas abscess, whether its vertebral origin is proved or not, is sufficient warrant for the lumbar operation, affording the best drainage and at the same time permitting the removal of a sequestrum or the curetting of a patch of superficial caries, if either of these conditions should be discovered by the finger or the probe.

Where the disease is associated with caries of one or more ribs the processes are more likely to be affected, and are in all probability the portions reached by the finger and the curette of the surgeon. Dr. White states that Dr. Agnew and he have had one such case, in which caries of the vertebral extremity of the third rib was the cause of an enormous cold abscess occupying the whole of the right scapular region. They curetted the process, *not* the body of the corresponding vertebra.

Three principal objections have been made to attempts to reach the focus of bone disease in these cases of spinal abscess:

1. It is said that operative methods practicable upon the cadaver cannot be employed in the presence of the angular deformity of Pott's disease, in which the last rib may be in actual contact with the ilium. These cases, however, are rare, and in them there is little indication for surgical interference, as the bodies of many vertebræ are deeply affected. The favorable cases are those of superficial caries, in which there is a curve of very large radius, or those in which there is disease of but a single vertebra and a very slight angular projection. In these two classes of cases the costo-iliac space is but little reduced.

2. It is said that the solidity of the spine is affected by operation. This, of course, cannot apply to cases in which curetting is employed. It is scarcely possible that the removal of a sequestrum could materially affect the integrity of the spine; and indeed this has not occurred even after very extensive removal of portions of vertebræ.

3. Operation is said to be useless. As a matter of fact, we have now the records of fourteen operations upon the bodies of vertebræ, with eight cures,

five cases improved, and one death, which had no relation to the operation itself.

As to the third indication in tuberculosis of the spine, viz., the relief of cord-pressure in Pott's paralysis, there is some encouragement to operation held out in the clinical facts—

1. That there are very many examples of the relief of paralysis in spinal caries after the pointing of a psoas or an iliac abscess, or after the evacuation of pus by the side of the spine.

2. That the disease of the dura mater in Pott's disease is limited to the site of the diseased vertebræ. The change from an inflammatory to a normal area is an abrupt one.

The analysis of forty cases of this operation for Pott's paralysis, which are all the author was able to bring together, shows that in twenty-two there was either improvement or absolute cure. The unsuccessful cases which recovered from the operation were in some instances the subject of secondary disease. The deaths were twelve in number, showing a mortality of 30 per cent., and were due to various causes, such as shock, or extensive renal and pulmonry disease. In others death was directly due to the gravity of the disease of the cord.

In coming to a conclusion as to the indications for operative interference in Pott's paralysis, the age of the patient is of great importance, the proportion of cures and of improvements being much greater in children and in adolescents than in adults.

The seat and extent of the osseous lesion are also important, the prognosis being unfavorable in direct proportion to the height of the caries—above all, when respiratory complications exist previous to the operation. All the patients who died had an upper dorsal or a cervical lesion except one, in which case the equally fatal condition of tuberculosis of a large number of vertebral bodies existed.

The effect of suspension in the treatment of Pott's paralysis has been so favorable in a number of cases that it should occupy a prominent position in the consideration of our therapeutic resources, and should be always tried, or, at least, carefully discussed, before operative measures are thought of.

The evidence at present available in relation to the operative treatment of spinal tuberculosis with symptoms of pressure upon the cord appears to justify the following conclusions:

1. The paralysis in Pott's disease is not, as a rule, due to a transverse myelitis, or a hopeless degeneration, and is not usually due to the pressure of the carious or displaced vertebræ, but is, in the majority of cases, the result of an external pachymeningitis, which results in the formation of an extra-dural connective-tissue tumor.

2. Speaking generally, a favorable prognosis is to be given, especially in children, in cases of Pott's paralysis in which the abscess, if any exists, can be evacuated; the treatment by extension and with a plaster jacket can be employed, and the patient can be put under the most favorable hygienic conditions.

3. In cases in which all this has been tried unsuccessfully, or in those in which the disease is slowly but steadily progressing to an unfavorable termination; when with more or less complete loss of motion and sensation

below the level of the lesion there are incontinence of urine and feces and the development of bedsores, and especially when acute symptoms threaten life, resection becomes entirely justifiable.

4. Operation having been decided upon for any or all of the above reasons, the prognosis will be favorable in direct proportion to the youth and strength of the patient, the absence of generalized tuberculosis, and the nearness of the lesion to the base of the spine.

5. When the tuberculous process affects the arches and there is paraplegia, we may sometimes operate, hoping not only to free the cord, but to remove, at the same time, the focus of disease. This double indication may also be fulfilled in those cases where, without bony disease, there is posterior pachymeningitis or a tuberculoma occupying the canal. Here again, however, time and careful attention to hygiene, including change to sea or mountain air, often works wonders.

6. If the lesion of the bodies of the vertebræ is in the lumbar region at a point where these bodies are accessible, it might be possible in certain cases to expose the cord from the back, by removal of the laminæ, with the object not only of removing pressure, but of reaching and taking away the diseased bone and tubercular granulation.

7. In tuberculosis of the body of a vertebra and compression of the cord by anterior pachymeningitis we can fulfil one indication—liberate the cord from pressure. We should operate only in grave cases where acute compression, the appearance of respiratory complications, the rapid development of degenerative processes, force us to interfere, or where the course of a chronic case is steadly toward a fatal termination, although no advanced visceral tuberculous lesions are present.

As to the third division of the subject, viz., neoplasms, Dr. White concludes that every case of focal spinal lesion thought to depend on a tumor, and not distinctly a malignant and generalized disease, should be regarded as amenable to operative interference, no matter how marked or how long continued the symptoms of pressure may be.

The fourth division, that of traumatism, is first considered historically, a summary of all recorded cases of operation for fracture being given. Dr. White then adds that in reviewing the statistics of these operative cases it seems proper that those belonging to the pre-antiseptic period should be omitted, or should be considered in a category by themselves. This would leave thirty-seven operations for fracture, with six complete recoveries, six recoveries from the operation with benefit, eleven recoveries unimproved, and fourteen deaths—a mortality of 38 per cent.

The chief strength of the opponents of operation lies in the argument that the operation *per se* is of great danger, or in itself materially diminishes the patient's chances. If, as Dr. White believes to be the case, it can be fairly claimed that rapid reunion of all the soft structures down to the dura mater itself can be confidently expected; if it can be shown, as it has been, that extensive resections of the laminæ do not greatly or permanently weaken the spine; if under antiseptic methods the risk of consecutive inflammation of cord or membrane is practically *nil;* if hemorrhage is not to be feared, and if loss of cerebro-spinal fluid is unimportant; if it happens not so very infrequently that the cord is directly compressed by fragments of the laminæ

themselves, or, if not, that by removal of the arches relief from anterior pressure *may* be afforded—if these are facts or even reasonably strong probabilities, it is evident that the operation is one which should no longer be rejected on the sole remaining ground that we cannot be certain in any given case as to the exact amount of damage which has been done to the tissues of the cord. The argument that, if such damage were irreparable, operative interference would be useless, while if the cord retained the power of recovering itself the operation would only add another complication, has lost nearly all its force. It would seem rather to be the duty of the surgeon, after a reasonable and not very protracted delay, to endeavor to relieve any possible pressure, to remove any fragments or spiculæ of bone, to drain thoroughly the canal, or even the subdural space, if there be any oozing, and to do so with the consciousness that, if he met with none of these conditions, he is at any rate not performing a necessarily fatal operation.

In conclusion, the opinions arrived at after consideration of this last branch of the subject are summarized as follows:

1. Some objections urged against operative interference in spinal traumatisms—*i. e.*, hemorrhage, frequency of absolute destruction of the cord, pressure from inaccessible fragments of bone, etc.—have been shown to be unsupported by clinical facts; others were largely due to a well-founded dread of (*a*) the shock in those cases operated on in pre-anæsthetic times, and (*b*) consecutive inflammation, suppuration, and pyæmia in pre-antiseptic periods.

2. The results of recent operative interference in properly selected cases of fractures of the spine are encouraging, and should lead to the more frequent employment of resection of the posterior arches and laminæ: (*a*) in all cases in which depression of those portions, either from fracture or from dislocation, is obvious; (*b*) in some cases in which after fracture rapidly progressive degenerative changes manifest themselves; (*c*) in all cases in which there is compression of the cauda equina from any cause, whether from anterior or posterior fracture or from cicatricial tissue; (*d*) in the presence of characteristic symptoms of spinal hemorrhage, intra- or extra-medullary.

3. Operation is contra-indicated by a history of such severe crushing force as would be likely to cause disorganization of the cord. The question which will remain in doubt previous to operation will usually be, that of the extent of damage done to the cord and the possibility of its taking on reparative action. As to this, the safest rule is that which has been formulated by Lauenstein, namely, that if after the lapse of six or ten weeks there is incontinence of urine with cystitis, or incontinence of feces, and especially if there are also the development and spreading of bedsores, but little is to be hoped for from the unaided efforts of Nature. If, however, these symptoms be absent, and if there be the least improvement in either sensation or motion, it will be proper for the surgeon to delay operative interference still longer.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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OF PHILADELPHIA.

A New Form of Mirror.

Dr. Th. Harke, of Hamburg, describes (*Deutsche med. Wochenschr.*, No. 28, 1891) a new form of adjustable mirror, readily affixable to a double-stemmed handle, pressure upon the expanded extremities of which will, during its use, slant the mirror to any desired angle from 100 to 180 degrees.

Anomaly of the Larynx.

Dr. Wilhelm Anton, of Prague, reports (*Prager med. Wochenschr.*, No. 27, 1891) a case in which a congenital pair of folds exist, above and apart from the normal ary-epiglottic folds, extending from each border of the epiglottis to the corresponding supra-arytenoid cartilage.

Anomaly of the Trachea.

Dr. H. Chiari describes (*Prager med. Wochenschr.*, No. 25, 1891) a new form of triple division of the trachea. The body of a male infant, sixteen days of age, from the clinic of Professor Epstein, was found to contain anomalies in the trachea, in the heart and aorta, and in the abdominal cavity, among the latter an overlapping of the hepato-duodenal ligament and an absence of the spleen. Just above the bifurcation of the trachea a third tracheal bronchus, three millimetres wide, was given off on the left side and was distributed to the upper lobe of the tri-lobed left lung. It differed from any of the eleven hitherto described instances of triple bronchus referred to in the paper.

Purpura of the Mouth, Pharynx, and Larynx.

Dr. Audubert, of Luchon, reports (*Ann. de la Polyclinique de Bordeaux*, No. 5, 1891) the case of a cooper, fifty years of age, whose health had been running down for several years with bronchitis, cough, pains in the shoulders, and slight modification of the voice. He was found to have extensive ulcerative tuberculous laryngitis. Two months later, Dr. Moure detected one day a number of purpuric spots disseminated in the palate, tongue, gums, and right ventricular band. They were not painful to the touch, and did not produce any functional disturbance. These spots had nearly disappeared ten days later, while fresh patches had appeared on the internal face of the left cheek, on the gums, and on the posterior wall of the pharynx, which supported a large ecchymotic patch, irregularly rounded, and from three to four centimetres in diameter. The nasal mucous membrane was healthy. There were no similar lesions upon any part of the cutaneous surface.

Fracture of the Larynx.

Professor E. v. Hofmann, of Vienna, reports (*Wiener klin. Wochenschr.*, No. 36, 1891) a number of instances of indirect fracture of the upper cornua of the thyroid larynx, the result of falls upon the head. They were all associated with serious lesions of the cranium or vertebra. The practical point illustrated is the medico-legal aspect of the subject in cases in which other lesions are not distinctive; it being the general opinion that fractures of this kind are due to strangulation, or to other direct injury to the neck.

Syphilis of the Larynx.

Dr. R. Beausoleil reports (*Annales de la Polyclinique de Bordeaux*, No. 5, 1891) a case of tardy hereditary syphilis in a lad, ten years of age, with gumma of the right ventricle, stenosis of the glottis, and ulceration of the pharynx.

Morbid Growths of the Larynx.

Dr. J. Garel, of Lyon, reports (*Ann. des Mal. de l'Oreille, du Larynx, etc.*, No. 6, 1891) an instance of spontaneous disappearance of a papilloma in a female infant, four years of age, after tracheotomy. The growth had occurred in sequence of an attack of influenza. It had occupied the entire left vocal band and the inter-arytenoid commissure.

Fibrous Tumors of the Preëpiglottic Region.

Dr. Laurent, of Brussels, reports (*Rev. de Lar., etc.*, No. 12, 1891) the case of a woman, forty-seven years of age, who began to cough from time to time in March, 1890, and finally quite continuously for a period of six weeks, during which she had become very much emaciated. The voice was very hoarse. The larynx was normal, but three small tumors were seen in front of the epiglottis, the largest one the size of a nut. They were smooth, of fibrous consistence, and of the color of the surrounding mucous membrane. The epiglottis was sometimes pushed backward by the growths. The growths were extirpated with cutting-forceps under digital guidance. The voice immediately improved. The histological character of the masses was rather vague. There was considerable fibrous tissue, with some connective cells and vessels. The fibrous tissue circumscribed in places some very small spaces, which were not distinctly cellular.

Evulsion of Morbid Growths of the Larynx.

An improved antero-posterior forceps for the evulsion of morbid growths is described by Dr. Suarez de Mendoza, of Angers (*Rev. de Lar., etc.*, No. 15, 1891). The laryngeal branches are fenestrated with slits three millimetres broad and twelve and a half centimetres in length, well up to the curve of the instrument, and one branch fits into its companion when the instrument is closed. The mechanism is rather complex, and hardly to be understood without diagrams. The advantage is that the field of operation can be kept in view through the fenestra, and thus injury be avoided to the healthy tissues.

Laryngectomy.

A case of unilateral laryngectomy for stricture in a boy, three years of age, is reported by Mr. Thomas F. Chavasse, of Birmingham (*Lancet*, 1891, No. 3547). The stricture was attributed to ulceration from an intubation tube which had been introduced nine months previously for laryngeal dyspnœa. The tube had to be reintroduced seven times in eight days, and was finally coughed up, swallowed, and voided per anum. When the tube was lost, tracheotomy was hurriedly performed to prevent asphyxia. The laryngectomy was performed practically without hemorrhage after the vertical cutaneous incision. The thyroid cartilage being divided in the middle line, the two sides were separated, disclosing complete occlusion of the larynx with cicatricial tissue. The soft parts were dissected from the right wing of the thyroid cartilage, which was then separated from its connection with the cricoid, and removed; and subsequently the right half of the cricoid had to be exsected by prolonging the incision down to the tracheal wound. The fibrous tissues were removed with scalpel and sharp spoon. Recovery was prompt. A chimney canula was then introduced, and was subsequently fitted with a phonal reed, with which the boy can speak clearly and distinctly in a monotone audible to a considerable distance.

[The compiler presumes that this operation was performed under the belief that mere extirpation of the cicatricial tissue in so small a larynx, without sacrifice of the cartilaginous framework, would have been followed by impermeable reconstriction.—Ed.]

Double Innervation of the Laryngeal Muscles.

It is well known that Exner has demonstrated that in animals the superior nerve participates in the innervation of those muscles of the larynx hitherto believed to be innervated by the inferior laryngeal only. It has even been supposed that spastic constriction of the glottis in certain instances of organic paralysis of the inferior laryngeal nerve might be explained on the theory that the superior laryngeal subserves the same functions in man that Exner claims for it in animals, and that its unimpeded influence when the recurrent is paralyzed produces the constriction, inasmuch as its distribution in animals predominates in the constrictor muscles. Two cases are reported by Dr. Newman, of Budapest (*Berliner klin. Woch.*, February 9, 1891), as negativing the idea that this double innervation exists in the human subject.

I. A man, thirty-five years of age, had complete bilateral paralysis of both recurrent nerves. His vocal bands were in the cadaveric position with incurvation of the edges anterior to the projecting posterior vocal processes. Secondary carcinomatous neoplasms, evident externally, compressed each recurrent nerve. When the patient succumbed from exhaustion to his carcinomatous disease, the larynx was subjected to the most rigid examination. Both recurrents were imbedded in masses of degenerated carcinomatous glands, where they were so thoroughly disorganized as to leave no traces, while they represented but an atrophic strand of connective tissue thence onward to the larynx. The superior laryngeals were fully intact; and hence the inference that in this individual at least they could not have innervated the

muscles in question. The muscles innervated by the inferior laryngeal were atrophied, especially the posterior crico-arytenoids, which were practically completely atrophied; the lateral crico-arytenoids were less atrophied, and the transverse and thyro-arytenoids least of all: confirmative of the theories of Semon and Rosenbach that the abductor fibres degenerate earlier than the adductors. The crico-thyroid muscle, on the other hand, innervated by the superior laryngeal was practically intact. Hence the inference that its action in stretching the vocal bands must be preceded by fixation of the arytenoid cartilage under innervation from the recurrent.

II. This was a case of attempted suicide in which the hyo-thyroid membrane on the right side and the trunk of the upper laryngeal nerve had been severed. Examined after closure of the wound, the pharyngeal and laryngeal mucous membrane was found in a condition of catarrhal inflammation, the epiglottis especially being deeply injected. There was right-sided paralysis of the soft palate. The interior of the larynx was filled with saliva. The epiglottis maintained its usual position in phonation. The right vocal band was not distended as much as the left in phonation, appeared somewhat smaller, and maintained a slightly higher level. The patient was hoarse, not from the catarrhal condition, but from the relaxed activity of the affected vocal band. This case shows that the superior laryngeal nerve simply stretches the vocal bands in virtue of its supply of motor filaments to the crico-thyroid muscle.

The Action of the Glottis in Singing.

Notwithstanding the immense number of photographs taken by Dr. Thomas R. French, of Brooklyn, that enthusiastic student of the mechanism of singing refrains from formulating any theory, so constantly is the camera revealing to him new surprises in the action of the vocal bands in every part of the scale (*New York Medical Journal*, January 31, 1891). Dr. French's paper, read at the Tenth International Medical Congress, is illustrated by thirty-nine reproductions from his extensive photographic collection. A most interesting series is given from the larynx of a well-trained soprano possessing a range of four octaves. Dr. French has not been able to determine that the action of the glottis is affected by training the voice. Like conditions are occasionally seen in the larynges of trained and untrained singers while singing the same notes in the same register, and the difference in the action of the glottis in trained singers are as great as between the trained and the untrained.

Dr. French's conclusions regarding the voice of the female are as follows: 1. The larynx may act in a variety of ways in production of the same tone in different singers. 2. The rule (which, however, has many exceptions) is that the vocal bands are short and wide, and the ligamentous and cartilaginous portions of the glottis are open during the production of the lower tones; the vocal bands increasing in length and decreasing in width as the voice ascends the scale, the aperture between the posterior portions of the bands increasing and the capitula Santorini tilting more and more forward, while the epiglottis rises until a tone is reached in the neighborhood of E, treble clef first line. Then the cartilaginous glottis is closed, the glottic chink becomes much nar-

rower and linear, the capitula Santorini are tilted backward, and the epiglottis is depressed. Shortening of the vocal bands in the change at the lower break in the voice is mainly due to closure of the cartilaginous portion of the glottis. As the voice ascends from the lower break the vocal bands increase in length and diminish in width, the posterior portion of the glottis chink opens more and more, the capitula Santorini are tilted forward and the epiglottis rises, until in the neighborhood of E, treble clef fourth space, another change occurs. The glottis is then reduced to a very narrow slit—in some subjects extending the whole length of the glottis, in others closing in front or behind, or both front and behind. Not only is the cartilaginous glottis always closed, but the ligamentous glottis is, Dr. French believes, invariably shortened. The arytenoid cartilages are tilted backward, and the epiglottis is depressed. As the voice ascends in the head register the cavity of the larynx is reduced in size, the arytenoid cartilages are tilted forward and brought closer together, the epiglottis is depressed, and the vocal bands decrease in length and breadth. If the posterior part of the ligamentous portion of the glottis is not closed in the lower, it is likely to become closed in the upper tones of the head register.

Paralysis of the Larynx.

Dr. A. Cartaz reports (*Arch. Internat. de Lar.*, etc., 1891, No. 4) a case of bilateral paralysis of the posterior crico-arytenoid muscles in a case of aneurism of the aorta.

Suppurative Phlegmon of the Epiglottis.

Dr. O. Chiari reports (*Wien. med. Woch.*, No. 13, 1891) an interesting case of suddenly developed suppurative inflammation of the epiglottis. Incisions into the epiglottis gave exit to fetid pus, but the symptoms increased so intensely as to require tracheotomy. The neck was so short that the trachea could not be exposed although the external incision extended to the sternal notch; so the thyroid gland was detached and the incision was made through the conoid ligament and the cricoid cartilage. Despite the desperate character of the case of the case, and considerable trouble with canulas owing to the anatomical relations of the larynx and trachea, the patient made a satisfactory recovery. It was supposed that infection had been produced by injury from a fishbone, although there was no positive evidence of traumatism; and the question is raised whether infectious phlegmon of the pharynx is not sometimes attributable to a similar cause though there be no direct evidence of its occurrence.

Œdema of the Larynx.

A case of œdema of the glottis in which tracheotomy seemed almost imperative was cured by M. Suarez de Mendoza, of Angers (*Arch. Internat. de Lar.*, etc., No. 3, 1891) by hypodermatic injections of pilocarpine. Three injections containing twenty-five milligrames were made at intervals of about twenty minutes. Marked relief followed the first one, and all danger had been passed fifteen minutes after the third. The same measure had been successfully resorted to by the same practitioner in two previous instances.

[The compiler can endorse this treatment from similar results in his own hands some years ago.—Ed.]

OBSTETRICS.

UNDER THE CHARGE OF

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The Surgical Treatment of Labor.

The recent literature of the surgical treatment of parturition contains among others the following papers of value:

In the *British Medical Journal*, 1891, No. 1606, page 789, Doran describes a case of tubal abortion with double hæmato-salpinx. The patient had given evidences of disease of the left appendages for several years. Following a delay in menstruation of three weeks, the patient was seized with violent pain in the hypogastrium. Such attacks of pain recurred at intervals, after one of which it was decided to perform laparotomy. The peritoneal cavity was found full of clot; the left tube was lacerated near the ovary; the right tube was uniformly distended with blood; its fimbriated extremity was patulous. Much of the great omentum had to be removed, as it was strongly adherent. Irrigation with hot water was practised, and a drainage-tube used. Recovery was complicated by an attack of nephritis at the end of the second week, and by rigors and fever, for which no explanation could be found, on the eighteenth day. The passage of mucous stools occurred at the same time. Upon examining the specimens, chorionic villi were found in the right tube; in the left tube the pathological appearances of acute catarrhal salpingitis were observed, but no ovum.

The Diagnosis of Early Extra-uterine Gestation.

This is the subject of a paper by J. Halliday Croom (*Edinburgh Medical Journal*, October, 1891). His first case was that of a multipara, in whom the classic symptoms of ruptured ectopic gestation were present. On opening the abdomen, it was found filled with fresh blood and enormous clots. The ovaries were enlarged and cystic; the tubes unruptured; no gestation sac could be found. The abdomen was closed, the hemorrhage continued unabated, and the patient died. No post-mortem examination was possible.

In the second case, a large hæmato-salpinx was removed, every symptom of ruptured tubal pregnancy being present except the discharge of decidua.

In a third case, a diagnosis of ectopic gestation was made from an enlarged heavy uterus at the left and posterior side of the pelvis; a cystic mass upon the right side which was tense, elastic, and very tender to the touch. When the abdomen was opened, an ectopic gestation of about two months was found, the mass being very adherent to the surrounding tissues. Croom concludes that the following points are of value for diagnosis:

1. The general signs of pregnancy.
2. Displacement of the uterus to one side by a tumor which gradually grows.
3. Passage of decidua with hemorrhage.
4. Paroxysmal pain upon one side.

The Diagnosis of Pregnancy in the Broad Ligament.

An elaborate description of this form of ectopic gestation, with drawings illustrating its anatomy, is given by Schauta (*Präger medicinische Wochenschrift*, Nos. 37 and 38, 1891). He describes the case of a patient who presented an abdominal tumor upon the right side reaching to the umbilicus; a second smaller tumor seemed connected with the first; these tumors were of varying consistence, and in the larger, fœtal parts could be plainly discerned. The smaller tumor was found to be the enlarged empty uterus. The tumor containing the child extended toward the right and behind the uterus, deep into the pelvis. It was not movable. A diagnosis was made of ectopic gestation upon the right side, the fœtus developing between the folds of the broad ligament. Upon opening the abdomen, the diagnosis being correct, the fœtal sac was removed, leaving a large cavity; the folds of the broad ligament were sutured to the peritoneum and fixed at the lower angle of the wound, and the aperture between the folds of the broad ligament was filled by a tampon. Recovery followed the operation.

Porro's Operation.

A Porro's operation for contracted pelvis is reported by Godson (*British Medical Journal*, 1891, No. 1606, page 793). Labor had proceeded for some time, and instrumental interference had been attempted. The usual uterine amputation was performed, the stump being fixed by Koeberlé's *serre-nœud* with one long pin. Death ensued sixty hours after operation, from general peritonitis. The patient was greatly debilitated when first seen; the intestines escaped from the abdomen during the operation.

He also operated upon a patient with rhachitic pelvis, who came under his care at the beginning of labor, before the membranes had ruptured or interference had been practised. A similar operation was performed, and resulted successfully. The peritoneum of the pedicle in its upper part was carefully stitched to the edges of the peritoneum in the abdominal incision, to shut off the communication with the peritoneal cavity. The patient had recovered in four weeks after the operation. Godson believes that the Porro operation should supplant craniotomy in many cases, and that where it is undertaken very early in labor the prognosis is favorable.

Two Cases of Amputation of the Uterus during Labor.

These are reported by Murphy (*British Medical Journal*, 1891, No. 1606). One was a case of cancer of the cervix, in which no life was found in the fœtus when the abdomen was opened. The uterus was drawn out of the abdomen, the broad ligaments tied with silk, the bladder separated from the vagina, and the uterus was removed entire. A small aperture was made

during the operation in the anterior wall of the vagina, and a drainage-tube was passed through this into the abdominal cavity. The patient died of exhaustion about thirty-six hours after the operation. On post-mortem no evidences of peritonitis were found in the abdomen, and the cancer had been entirely removed in removing the uterus. Murphy also operated by Tait's method of amputation in a patient who had contracted pelvis, and was in the beginning of labor. The patient made a good recovery. He urges the abandoning of craniotomy for uterine amputation, and states that he has never consented to be present at the performance of craniotomy upon the living child.

Removal of a Large Myoma and the Pregnant Uterus.

In a series of four cases of removal of myomata by abdominal section, Ross (*American Journal of Obstetrics*, No. 165, 1891) describes a case of œdematous myoma accompanied by pregnancy. At an operation, a large myoma weighing thirty-five pounds was found at the back of the left broad ligament. A pedicle was made of the cervix uteri, and after tightening a rope clamp over the tumor and the pregnant uterus, both were cut away. A wire clamp was then applied, pins inserted, with antiseptic dressing. Recovery was complicated by obstinate vomiting, caused by traction upon the stump. The clamp was removed on the nineteenth day, and the patient made a good recovery.

Repeated Cæsarean Section.

Rosenberg reports three cases of repeated Cæsarean section by Leopold, at Dresden (*American Journal of Obstetrics*, No. 166, 1891). The operations were successful. Leopold has found that in the repeated operation separation of the recti muscles is often observed. The uterus is also frequently adherent to the abdominal walls. Atony of the uterus is sometimes observed. Leopold determines the position of the placenta by observing that when the major portion of the uterus is anterior to the insertions of the tubes, which in most cases can easily be felt, the placenta is anterior, and *vice versâ*. It is well to avoid the placenta in these cases, and also when inserting a bougie to induce labor. Silver wire is the least desirable material for uterine suture, and when stitches are found in the uterus in the line of the incision, it is well to dissect them out. Silk is most universally employed and gives good results. A table of thirty-six cases of the repeated operation is appended; ten of these ended fatally. The number of sections made upon a single patient varied from two to five.

The Technique of Cæsarean Section.

Poten (*Archiv für Gynäkologie*, Band xl. Heft 3) reports three cases of Cæsarean section for rhachitic pelves with good results, in which no special caution was taken to suture the peritoneum over the uterus separately. The needle was passed through the peritoneum and muscular substance at one time, and care was taken not to pass the suture through the decidua.

Introduction a l'Étude Clinique et a la Pratique des Accouchements.
(Manual of Obstetric Demonstrations.)

Under this title Farabeuf and Varnier have prepared an elaborate manual adapted to illustrate a course of demonstrations of operative obstetrics given to the students of the Maternities of Paris. The book is a large volume of more than 400 pages, in large, clear type, with 362 illustrations. These are the best of their kind which we have seen. The mother's tissues are heavily shaded, the fœtus is in heavy outline only. Normal and abnormal presentations, the anatomy of the pelvis, the mechanism of labor, and version and the forceps are clearly represented, with the multiplicity of detail characteristic of French obstetric science.

At present the simple conception of labor and its mechanism prevalent in German teaching is being adopted by Americans, and, we think, greatly to their advantage. Aside from the complicated text with its minute detail, the illustrations make the book valuable to all who demonstrate obstetrics. We shall expect to meet some of these illustrations in the pages of future text-books.

Die Sterblichkeit der Kinder im Ersten Lebensjahre.
(Infant Mortality.)

Under this title Bernheim has written a pamphlet, giving his studies in the causation of infant mortality at Würzburg. His conclusions are good for cities in the same latitude, and advance several points of practical interest. Finding infant mortality 37 per cent., among the chief causes are given failure to nurse and illegitimate birth. As a general endeavor to prevent the action of these causes, those agencies which lessen pauperism, drunkenness, and prostitution are to be encouraged. The mortality curve rises highest in July, and dry heat is most fatal. Hence the endeavor should be to provide air-spaces in cities and to sprinkle city streets freely. The use of sterilized milk and cold bathing are also urged.

Milk and its Contamination.
(Die Milch, ihre häufigeren Zersetzungen, etc.)

Scholl, of the Institute of Hygiene of Prague, writes an excellent pamphlet of 130 pages on this subject. His statements on milk contamination by germs and its conveyance to human subjects are especially interesting, and lead him to the emphatic conclusion: "Raw milk should not be used under any circumstances; all milk should be sterilized before it is sold."

He quite agrees with the precaution taken by obstetricians in prohibiting an infected mother from nursing.

Pyæmia Following Rupture of the Umbilical Cord.

A case remarkable for the manner in which septic infection, originating at the umbilicus, became diffuse is described by Deichmann in the *Deutsche medicinische Wochenschrift*, No. 37, 1891. When first seen, the child, nine

months old, was suffering from severe septic infection. The right half of the body, from beneath the axilla to the crest of the ilium, showed an œdematous swelling deeply injected, and especially prominent over the liver. Fluctuation could be felt near the mammary region. The entire swelling was painful, but no superficial lesion at which it originated was observed.

It was ascertained that the child's birth had been normal, and that when the cord separated hemorrhage occurred from the umbilical ring, which was checked by a midwife by the application of cotton and a bandage. This cotton was not removed for three days after its application. A discharge of serum, followed by pus, occurred after the removal of the bandage, and this discharge persisted from the umbilical ring for six months. After two months' treatment by the application of a powder, the secretion gradually ceased, but redness of the skin, with considerable swelling, ensued. On examination, it was evident that extensive suppuration in the deeper layers of the skin existed. Points of fluctuation were freely opened, undermined tissues were thoroughly douched with bichloride solution, and the dressings were frequently changed. At the end of the second week metastatic abscesses formed in various portions of the right half of the body. They were opened in turn, and the child finally made a complete recovery.

An Epidemic of Pneumonia in Infants, occasioned by Infected Straw.

It is the custom in the obstetric clinic at Heidelberg to use straw beds, which are emptied after each patient is convalescent, the tick thoroughly washed, and filled with fresh straw. Gartner (*Centralblatt für Gynäkologie*, No. 27, 1891) noticed an odor from the straw in some of the beds, and observed that the patients in these beds had slight elevation of temperature, and that several of the children became ill with pneumonia. He made a bacteriological examination of the straw, of the dust about the bed, and found streptococci and staphylococci, beside other microörganisms. He then examined the lochia of the patients, finding the same germs there present, and also identified these germs in the secretions of the nose and mouth of the infants. In post-mortems upon five cases lobular pneumonia was present, caused by an abundance of streptococci and staphylococci. Control inoculations upon animals demonstrated infective power of these bacilli.

Gonorrhœa of the Mucous Membrane of the Mouth in the Newborn.

Five cases of gonorrhœal infection of the mouth in infants are reported by Rosinski in the *Zeitschrift für Geburtshülfe und Gynäkologie*, Band xxii., Heft 1, 1891. In most of the cases the maternal source of infection was clearly demonstrated. The lesion was an infiltration of the tissues upon the tongue and hard palate, with a characteristic yellowish mass composed of gonococci and pus-cells. The general health of the children was not especially disturbed, and very little pain or distress was observed. In some instances, gonorrhœal ophthalmia was also present. The children recovered under appropriate treatment. Those who had ophthalmia were sickest, and suffered considerably.

Vaginal Injections Unnecessary in Normal Labors, especially where External Examinations Only are Practised.

The belief already advanced by Mermann, that injections and internal examinations could be dispensed with to advantage, finds support in a paper by Leopold and Goldberg (*Archiv für Gynäkologie*, Band xl., Heft 3, 1891). Their material for comparison embraces 1358 cases, of which 1073 received no injections; 269 were not examined internally. A comparison of the percentage of infection during a series of years showed that only five-ninths as many cases occurred when no injections were given, as when they formed a routine treatment. In normal cases their employment has been abandoned. From the fact that the absolute disinfection of the hands is exceedingly difficult, it is argued that internal examinations should be as infrequent as possible, and especially in view of the present cultivation of the method of diagnosis by external examination.

[The recent researches of Welch, described in his article on "Wound Infection," in the November number of the Journal, bear directly upon the question of the disinfection of the hands. He found the ordinary method of using soap and water, and sublimate solutions, quite inefficient, and suggests the employment of a solution of permanganate of potassium, followed by dilute oxalic acid. He isolated a bacterium which seemed to have its especial habitat in the skin, and which is not destroyed by the ordinary disinfection with sublimate.—Ed.]

Leukæmia and Pregnancy.

In contrast to some recent writings upon the blood in pregnancy, which seemed to show that anæmia is not peculiar to the pregnant condition, is the paper by Laubenburg in the *Archiv für Gynäkologie*, Band xl., Heft 3, 1891. His study of the subject has led him to conclude that oftentimes lukæmia results from pregnancy, parturition, or the puerperal state. Pregnancy may even be interrupted by leukæmia, which exerts an unfavorable influence upon this condition. The prognosis of these cases may become seriously complicated by this disorder; in such cases the early induction of labor is not only justifiable, but is the duty of the physician.

GYNECOLOGY.

UNDER THE CHARGE OF

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Intra-venous Infusion of Salt Solution in Acute Anæmia.

Thomson (*Deutscher med. Wochenschrift*, 1891, No. 19) reports twelve cases of acute anæmia from hemorrhage (nine following labor and three surgical

operations) which were treated by infusions of salt solution (one-half of one per cent.), eight being intra-venous, two intra-peritoneal, and two both intra-venous and intra-peritoneal. Four patients were saved. He prefers the intra-venous method, as it is simpler, can be rapidly practised, and is devoid of danger. Subcutaneous injections of the same solution act too slowly, and when the heart is weak it is unable to carry the fluid into the general circulation. If the median vein cannot be found the vena saphena may be utilized. Intra-peritoneal infusion should be employed only after laparotomy. Other solutions have been recommended, but they possess no advantage over the saline.

STÄHLE (*Deutscher med. Wochenschrift*, 1891, No. 22) reports a case of post-partum hemorrhage in which the patient had become almost pulseless. A litre of Landerer's sugar and salt solution were injected in the course of an hour, with a successful result. He adds the caution that the proper time for the injection is when the pulse has improved a little, showing that the heart is able to carry the solution into the circulation.

CASTRATION IN OSTEOMALACIA.

THOM (*Centralblatt für Genäkologie*, 1891, No. 41) reports the following successful case: The patient, aged thirty-two years, had had three children. Her symptoms dated from the birth of the second child. She had severe pains in the pelvic bones, with marked deformity, was unable to walk, and showed progressive emaciation and œdema. The uterus was retroflexed and fixed. The adnexa were removed and the adhesions separated. It was noted that all the pelvic tissues were unusually softened and congested. The patient improved rapidly after the operation, the pains in her bones disappeared, and she was soon able to walk. A year after the operation she was perfectly well.

The writer accepts Fehling's theory that the disease is a reflex trophoneurosis of the bones dependent upon ovarian activity.

ARTIFICIAL PYO- AND HYDRO-SALPINX IN ANIMALS.

WOSKRESSENSKY (*Centralblatt für Gynäkologie*, 1891, No. 42), after a series of experiments upon rabbits, arrives at these conclusions:

1. In the Fallopian tube of the adult rabbit there is a secretion which in from four to six weeks forms a large hydrosalpinx, if both ends of the tube are ligated.

2, This secretion is most abundant at the abdominal end of the tube, so that a hydrosalpinx will be formed if the abdominal end alone is tied.

3. If croton oil, or a fluid containing the streptococcus aureus, is injected into the uterine cavity or tube, there results a localized exudation which neither tends to extend to the peritoneum nor does it cause any general disturbance.

THE ULTIMATE RESULTS OF REMOVAL OF THE ADNEXA.

In view of the general interest recently exhibited in this subject, the following statements by TAIT, made at the recent French Surgical Congress, are important. He divides these cases into three classes—those in which the

adnexa are removed for the cure of myomata or metrostaxis, for disease of the tubes and ovaries, and for nervous disturbances. His mortality in 271 cases of myoma was 2.2 per cent. All but eight of the cases were successful. In patients under forty 70 per cent. of the tumors disappeared; in those between forty and fifty it diminished in size from one-sixth to one-third. There were transient climacteric disturbances, but only one case of permanent psychosis, in a patient who showed evidences of mental derangement before the operation. In 5 per cent. of the operations for diseased adnexa a suppurating sinus remained. It is necessary, he thinks, to wait longer for a cure in this class of cases than in the former. Persistent pain, exaggerated every month, is common, but it seldom lasts longer than a year after the operation. In only 4 cases was it necessary to perform a second laparotomy on account of cystic enlargement of the stumps. The writer has found that coitus is less painful after the operation, and that sexual desire is usually present.

He has seldom operated simply for the cure of neuroses, and always at the urgent desire of the patient, although he believes that the operation has a future. In the two cases in which a sufficient time had elapsed to judge of the result it was entirely satisfactory.

Serous Retro-peritoneal Cysts.

Obalinski (*Wiener klin. Wochenschrift*, 1891, No. 39) concludes an article on this subject with the following *résumé:* These cysts, though rare, occur more frequently than is usually supposed, and are found in the male, as well as in the female. As they develop slowly, they seldom attain a large size or give rise to symptoms. They are usually situated near the kidneys, and probably spring from the Wolffian bodies. As their walls are firm, though thin, and they are not adherent to the peritoneum (from which they are separated by loose connective tissue) their removal is not difficult. Their contents consists of an aqueous fluid, which may not reaccumulate after puncture; however, extirpation is preferable to puncture, as it can be accomplished easily and without danger.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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Seventh International Congress of Hygiene and Demography—London, August, 1891.

The full text of all the papers sent in, whether read or not, will appear in the *Transactions* presented to every member. I propose, therefore, in this report to give brief notices of such only as contained something new or of

special practical or scientific value, as I have hitherto done with the papers published in the English and foreign journals devoted to Public Health.

DIPHTHERIA.—Dr. Schrevens, of Tournai, from an analysis of the distribution of enteric fever and diphtheria in Belgium, and the relatively greater incidence of the latter in rural districts, concludes that, though both are fecal or filth diseases, pollution of the surface is more conducive to the development of Löffler's bacillus (diphtheria), as that of the subsoil to Eberth's enteric. Personal contact contributes greatly to its propagation, but Dr. Schrevens believes that poultry are susceptible to, and play an important part in creating foci of the disease.

At the annual congress of the British Medical Association, in 1883, I maintained this view of the etiology of diphtheria in opposition to Drs. C. Kelly, Slade King, Hubert Airey, and others, who connected its prevalence in rural districts with exposure to cold and wet, rather than with a specific cause. I asked: "Where does one meet, in close proximity to houses, with foul dunghills, pigstys, etc., saturating the surface soil with putrescent matters, more frequently than in villages and rural homesteads?" and, after quoting Soyka on the relative distribution of enteric fever and diphtheria in Munich, I said: "In fact it would appear that surface accumulations of filth are more likely to generate diphtheria, and pent-up putrid gases to produce enteric fever."

MATERNITY HOSPITALS.—Dr. Priestly, in an exhaustive review of these hospitals throughout Europe, showed that the saving of life effected within the last ten years amounted to over 3000 annually, which he attributed mainly to the general adoption of antiseptic measures.

MALARIA AND ENTERIC FEVER IN AFRICA.—Dr. Felkin observed that the comparative immunity of the natives from malaria was, to a great extent, due to acclimatization, for when moved from one area to another they suffered almost as much as Europeans. Enteric fever was endemic in all parts of Central Africa, and phthisis was by no means unknown; but, so far as he knew, it occurred only in elevated areas where malaria was rare or altogether absent. In malarious districts he had never seen a case of phthisis. He did not believe in *typho-malarial* fever as a separate disease, but was convinced that the fever so called was merely enteric, occurring in an individual saturated with the malarial poison.

FILARIA SANGUINIS HOMINIS DIURNA AND PERSTANS.—Dr. Patrick Manson discussed the mutual relations of the *Filaria s. h.*, negro lethargy or the sleeping-sickness of the West Coast of Africa and the Congo, and the papulo-vesicular disease known as Craw-craw, peculiar to the same regions. He considered the *F. loa* to be the parental form of *F. s. h. diurna*, and the mangrove fly its intermediary host. The life history of *F. s. h.* was at present wrapped in obscurity, but from the analogy between it and the very similar *F. medinensis*, he believed the intermediary host of *F. s. h. perstans* to be a fresh-water animal, probably a cyclops or other entomostracon.

THE HÆMATOZOÖN OF MALARIA.—Dr. Laveran described the several forms of the *Plasmodium*, spherical, flagelliform, cruciform, and rosette-shaped, and the conditions under which each was assumed. He was satisfied as to the essential connection of the plasmodium with paludism, though he could not define the precise nature of this connection as cause, concomitant,

or effect, and he admitted that hæmatozoa very similar morphologically were met with in the blood of other animals, even birds and reptiles, under circumstances precluding all suggestion of paludism. There were, however, differences quite sufficient to indicate that these were specifically distinct.

FERMENTATIONS EXCITED BY SPECIFIC MICROÖRGANISMS.—Dr. Percy Frankland had succeeded in isolating the bacillus of nitrification, or that which, present in the soil, has the power of oxidizing organic nitrogen and converting ammonia into nitrous and nitric acids. It had no action on gelatin plates. In his experiments nitrous acid only, not nitric, was formed. He had also isolated one which he called *B. ethaceticus*, which, when grown in any of the carbohydrates (except dulcite) produced ethyl alcohol and acetic acid, also formic and traces of succinic acid. By its means he split glycerin into an optically active form on which it had no effect, and an inactive one which it broke up by fermentation. The action of the pneumococcus of Friedländer on carbohydrates he found to be, as Brieger had already shown, identical with that of his *B. ethaceticus*.

IMMUNITY.—Mr. Hankin, Fellow of St. John's College, Cambridge, discussed the nature and action of defensive proteids, which he divided into *sozins* present in normally, and *phylaxins* in artificially, immune animals. Each was further divisible into myco- and toxo-sozins or phylaxins, according as they acted by killing the bacteria, or by destroying the toxins produced by them. The action of phylaxins was limited to one disease, while that of sozins extended to several species of bacillus and their products.

Conditions inducing susceptibility in animals otherwise immune, were found to be attended by a diminution in the amount of the defensive proteid previously present in the serum. This theory in no way excluded that of phagocytosis, since it was by means of these proteids that the phagocytes acted on the bacilli.

Dr. Armand Ruffer described a number of experiments with the *B. Chauveaui*, with somewhat paradoxical results, but proving, among other things, that the number of microörganisms introduced, and the inflammatory reaction, or rather the migration of leucocytes toward the point of inoculation, were in inverse proportion; that the leucocytes were attracted thither by a chemical poison; that they absorbed the bacilli while these were still living; that in acute infectious diseases the leucocytes did not emigrate, but were nevertheless active, and that if they were by any means prevented from reaching the virus, the disease ended fatally, even in animals naturally or artificially immune.

BACTERIOLOGICAL EXAMINATION OF WATER. — Dr. Percy Frankland insisted on the necessity for conducting such examinations immediately, since even in distilled water the multiplication of colonies was so rapid as to falsify all conclusions as to the purity of any sample.

MEAT INFECTION, OR FOOD POISONING.—Dr. Ballard gave the results of an inquiry conducted by him on behalf of the Local Government Board into numerous instances of poisoning by cooked meat, especially pork, during the last twelve years. The principal conclusions were: (1) The effects were usually gastro-enteric irritation, but in one case true pneumonia. (2) The immediate cause was a toxin generated by bacilli, either in the food itself or in the body of the consumer. (3) That the decision of this question rested chiefly on the

interval elapsing between the ingestion of the food and the development of the symptoms. (4) The poison usually appeared to have been formed after the meat had become cold, and had been kept some time at the ordinary temperature; while the greater frequency of such phenomena in pork seemed to be connected with the larger percentage of gelatin in it than in other flesh foods.

SCHOOL HYGIENE.—An exhaustive scheme for inquiry into the physical and psychical characters and antecedents of children of feeble intellect was submitted by Drs. Strumpell, F. L. A. Koch, Emil Schmidt, and Ernest Hasse, than which it would be difficult to devise a better.

Prof. Leo Burgerstein, the well-known school physician of Vienna, described an experiment designed to test the degree of brain fatigue consequent on continuous application, which consisted in engaging four classes of children, grouped according to sex and age, in ordinary arithmetic, for four consecutive periods of ten minutes separated by intervals of five minutes, and comparing the number of figures worked and errors made in each period. The errors increased in the second and notably in the third period far in excess of the increase in the number of figures worked; though contrary to what might have been expected, there was some improvement in the fourth period. The idea is a good one and deserves to be further developed.

Mr. Arbuthnot Lane read a paper of great scientific interest to the surgeon, and to those in medical charge of the young, in which he insisted on the remarkable adaptation of structure in joints consequent on certain manual and mechanical employments, especially when commenced before growth and ossification were complete. In the light of these observations he explained the origination of spinal curvature and faulty attitudes, the true nature and causation of which were, he maintained, generally misapprehended, effects being taken for causes.

COPPER POISONING.—Prof. Lehmann, of Würzburg, while deprecating on every ground the addition of copper salts to preserved fruits and vegetables, and to flour in bread-making, saw no reason to condemn the use of copper for culinary utensils, provided common care and cleanliness were observed. It was only when strongly acid liquids were allowed to stand long and to cool in copper vessels, that any appreciable solution of the metal took place, and even then the amount could scarcely reach the 3 grains per head among the consumers required to set up symptoms of gastro-enteritis. Since there were no recorded cases of acute copper poisoning through "greened" preserves, but many from the use of copper utensils, he was strongly inclined to doubt the correctness of the latter, which he believed were really due to ptomaines and to toxalbumins, the copper having been assumed as the cause, since no definite poison has been detected—that is, none answering to the ordinary chemical tests.

SANITARY ENGINEERING.—The recorded instances of the occurrence of outbreaks of enteric fever following the specific pollution of wells or of reservoirs, as at Croydon, in England, and Plymouth, in America, are so numerous as to leave no doubt as to the propagation of that disease, as of cholera, by means of public water supplies. But it is certainly remarkable that until quite recently no indisputable case of such a result consequent on the entrance of the fecal discharges of enteric fever into large rivers at points above the

in-takes of water companies could be appealed to. Almost the only classical example was that of the outbreak at Gloucester, following three or four weeks after the epidemic at Kidderminster, some twenty miles higher up the Severn. It is not unreasonable to attribute the immunity attending the use of running streams at points some miles below the point of such sewage discharge, to the fatal action of light on the bacillus of Eberth, in marked contrast to its inertness on cultures of those of cholera (Koch's) or of diphtheria (Löffler's).

But an instance at least as palpable as that of Gloucester was described by Mr. Kummel, of Altona, as having occurred in that town in February of the present year.

Hamburg and Altona both draw their water from the Elbe, the former without, the latter with careful filtration; but while Hamburg has its in-takes at some distance above the city, Altona pumps its below, *i. e.*, after it has received the sewage of half a million persons; and three or four weeks before the appearance of the disease the number of bacteria suddenly rose from 50 or 80 to 1500 in the cubic centimetre, falling again to the normal synchronously with the subsidence of the epidemic. As enteric fever was almost entirely absent from Hamburg at the time, Mr. Kummel suggests that the filter-beds themselves may have acted as culture fields.

Mr. Oesten, engineer to the Berlin Water-works, described an unexpected accident, viz.: the entrance of impurities (in this case, sand) into water mains under considerable internal pressure. Ordinarily, the tendency under such circumstances would be leakage outward, but if the fissure formed an acute angle with the direction of the flow in the mains, so soon as a certain velocity was attained a "suction action" was set up, drawing inward, notwithstanding the pressure, the ground-water and any impurities contained in the surrounding soil.

In a paper on the water-supply of maritime towns, including those on the tidal reaches of rivers, I approached the question from what was, so far as I could learn, an entirely new standpoint, viz.: that while *inland* towns—if, as I maintain they always would, they disposed of their sewage by irrigation—returned to the land the whole of the water they had taken, whether from rivers or wells, *maritime* towns discharged it directly or indirectly into the sea, leaving the land so much the poorer for the loss. In the case of London, the general lowering of the water in wells, and the drying-up of the smaller streams in the surrounding districts, showed that the demand already exceeded the available portion of the rainfall, and that no extension of the supply could be sought in the basin of the Thames without serious detriment to the agricultural interest.

Maritime towns, if of considerable size, must, therefore, have recourse to areas where the rainfall is in excess of the local requirements, as moorlands and lakes in mountainous districts, or to a source hitherto ignored by engineers, viz.: underground waters which find their way to the sea without giving rise to rivers, in other words run to waste. Such is the source of the Brighton supply, great part of the drainage of the Weald finding its way under the chalk of the South Downs to the sea; and I believe, on geological and hydrological grounds, a like waste would take place along the north coast of Kent, and in many other localities where ranges of hills run parallel to the coast, the dip of their beds inclining seaward.

In a warm discussion on burial reform, the advocates and opponents of

cremation, represented by Sir Henry Thompson and Mr. Seymour Haden, were as one in condemning the use of strong imperishable coffins. The effect of thick elm or oak in preventing the natural disintegration of the body was strikingly illustrated, as Dr. Gibbons related, during the excavation of part of St. Andrew's Churchyard, where corpses interred two hundred years ago were found in nearly the same state as those buried within twenty years, being imbedded in layers of crushed and compressed wood.

SECTION OF DEMOGRAPHY.—Dr. Ogle showed the comparative mortality of men between twenty-five and sixty-five years of age, in a number of occupations selected as representative. This method was preferable to taking the mean age at death, since, after the age of sixty-five few continue in active pursuits. The clergy were set down as the standard of one hundred, and the several factors determining the proportion of disease and death given as—(1) Working in cramped attitudes, especially such as impede respiration. (2) Over-work, especially sudden muscular efforts and strains. (3) Dealing with noxious substances, as lead, mercury, infected hides, etc. (4) Working in ill-ventilated and over-heated rooms. (5) Alcoholic excess. (6) Liability to accident. (7) Exposure to inhalation of dust.

The influence of alcoholic indulgence was conspicuous in the comparative mortality of innkeepers, 274; and their male servants, 397, the highest figure of all; and scarcely less so among cab and omnibus drivers, 267; and costermongers, street-hawkers, etc., 338. Temperance advocates are guilty of a fallacy in ignoring foul air and long and late hours, from which barmen and barmaids, were they even total abstainers, would suffer still more than drapers, tailors, and printers.

The factor of good or bad ventilation in mines, where other things were fairly equal, was seen in the mortality of coal and iron miners, 160, and of the Cornish miners, 331, or more than twice that of those in the north.

That life in the open air should be attended by freedom from phthisis is what one would expect, yet men exposed to all vicissitudes of weather are no less exempt from other diseases of the respiratory organs.

Here fishermen are taken as the standard, having the lowest mortality from pulmonary diseases:

Occupation.	Mortality from:		
	Phthisis.	Other respiratory diseases.	Phthisis and other respiratory diseases.
Fishermen	55	45	100
Agricultural laborers	62	79	141
Grocers	84	59	143
Drapers	152	65	217
Tailors	144	94	238
Printers	233	84	317

The influence of dust is very marked, but in order to eliminate the fallacy involved in comparing occupations followed by men of very different physique and strength of constitution, I have selected four strictly comparable, and reduced them to the standard of the healthiest.

Occupation.	Mortality from:		
	Phthisis.	Other respiratory diseases.	Phthisis and other respiratory diseases.
Coal miners	38	62	100
Masons and bricklayers	76	62	138
Quarrymen	93	83	176
Cornish miners	210	140	350

In the case of the Cornish miners, the cause of the high mortality is, however, the absence of ventilation in the deep tin mines, rather than any excess of dust.

Taking in like manner four dusty occupations not necessarily confined to men of robust constitution, and reducing them to the standard of the least unhealthy, Dr. Ogle's figures would appear as follows:

Occupation.	Mortality from:		
	Phthisis.	Other respiratory diseases.	Phthisis and other respiratory diseases.
Bakers	53	47	100
Cotton-mill hands	110	110	220
Cutlers	150	158	308
Earthenware-makers	192	260	452

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INDEX.

ABDOMINAL massage, treatment of constipation in children by, 291.
Abdominal surgery, forcipressure in, 215
Acute pemphigus in an infant, 325
Adenoma uteri, 109
Adnexa, removal of, 677
After-coming head, forceps to, 314
Albumin, a new test for, 192
Albuminaturia, 412
Alcoholism, chronic, strychnine in, 405
Allen, treatment of erysipelas, 51
Allochiria, 411
Aloin, 291
Amputation of the entire upper extremity, 657
Amyl-hydrate, administration of, 80
Anæmia, acute, intra-venous infusion of salt solution in, 676
Anæmia and anorexia nervosa, treatment of, 238
Angina pectoris, 191
Aniridia and glaucoma, 550
Anthrax, treatment of, 202
Antipyrine as a hæmostatic, 404
Antipyrine, iodides of, 643
Antiseptic, a new, 529
Aorta, death from spontaneous rupture of, 187
Appendix vermiformis, resection of, 91
Aristol and iodoform, 81
Aristol and its uses, 202
Arsenic as a drug, 183
Articular rheumatism, carbolic acid in acute, 534
Artificial pyo- and hydro-salpinx in animals, 677
Asepsis and antisepsis in operative surgery, 495
Aseptic and antiseptic gynecological surgery, 169
Asthma, cardiac, oxygen inhalation in, 647
Asthma in children, 105

BACILLI, colonies of, 412
Bacillus of typhoid fever, intra-venous inoculation of, 653
Bacterium coli commune in the pus from a dysenteric abscess of liver, 192
Balano-posthitis, erosive, 307
Barrs, clinical observations on the cardiac bruits of chlorosis, 347
Bassorin paste, 429
Bilateral pareses and pseudo-plegias of childhood, 600
Bond, urea and serous membranes, 269
Bradycardia, or the slow heart, 295
Brain, punctured orbital wound of, 658
Bright's disease, pregnancy with, 485
Bromides, new mode of administering, 530
Bronchiectasis in young children, 557
Bronchitis, acute, 290
Browning, bilateral paresis and pseudo-plegias of childhood, 600

CACTINA, 186
Cæsarean delivery, possible results of, 371
Cæsarean section, 316
Cæsarean section, repeated, 673
Cæsarean section, technique of, 673
Cancer, high amputation of cervix uteri for, 436
Cancer, rectal, operative treatment of, 93
Cancer, vaginal hysterectomy for, 436
Cantharidin, 540
Carbohydrates, influence of, upon proteid metabolism, 538
Carcinoma corporis uteri, diagnosis of, 318
Carcinoma, development of, 323
Carcinoma of larynx, 205
Cardiac disease, Cheyne-Stokes respiration as a symptom of, 297
Castration, influence of, 323
Castration in osteomalacia, 677
Catarrh, gastro-intestinal, 538
Cerebral suppuration following influenza, 297
Cerebral surgery, 219
Cervico-vesico-vaginal fistula, closure of, 216
Chest, new method of dressing, 558.
Children, strophanthus in, 556

Chittenden, treatment of tuberculosis with Koch's lymph, or tuberculin, 1
Chloroform administration, death during, 80
Chlorosis, cardiac bruits of, 347
Cholesteatoma, an etiological study, 199
Chorea, kindred of, 578
Chyluria, treatment of, by thymol, 292
Cocaine, 648
Coe, adenoma uteri, 109
Collins, pathology of ophthalmoplegia, 512
Common carotid artery, ligation of, 327
Congress of hygiene and demography, seventh international, 678
Cornea, transplantation of, 548
Corns and warts, 405
Corrigendum, 564
Corrosive sublimate as a disinfectant, 75
Cortical and visual centre in monkeys, 310
Craniectomy for microcephalus, 546
Creasote, 644
Creasote and iodoform injections, dangers of, 647
Crystalline lens, nutrition of, 311
Cutaneous absorption of drugs incorporated in fatty substances, 646
Cystopexy, 103
Cysts, serous retro-peritoneal, 678

DEAFNESS, relief of, operation for, 421
Deciduoma, 322
Defective inter-ventricular septum without cyanosis, 656
Delafield, diseases of kidneys popularly called Bright's disease, 329
Dercum, the back in railway spine, 247
Dermatitis as an excretionary symptom, 203
Diabetes and vascular sclerosis of the pancreas, 300
Diabetes, salicylate of sodium in treatment of, 649
Diabetes, treatment of, 527
Diphtheria, bacillus of, 560
Diphtheria, histological changes in experimental, 653
Diuretin, 533
Dropsy, diuretin as a means of removing, 292
Drying-in liniments, application of, 429
Dupuytren's contraction, 308

ECLAMPSIA, hepatic lesions of, 315
Eclampsia, pathology and treatment of, 212, 551, 552
Ectopic gestation, 212
Electric cataphoresis, 642
Elephantiasis of scrotum, 352
Empyema, double, 294
Empyema in children, etiology of, 40, 151
Empyema, pulsating, 650
Epilepsy, Jacksonian, 587
Epilepsy, treatment of, 287, 528
Epithelioma, removal of an extensive, 658
Ergot for hypodermatic use, 641
Erysipelas, treatment of, 51, 647
Ether, paralysis following injections of, 103
Europhen, 642
Extirpatio uteri sacralis, 104
Extra-uterine gestation, early, 671
Eye, diseases of, peroxide of hydrogen in, 530
Eyes, mercury in syphilitic disease of, 548

FALLOPIAN tubes, histology of, 377
Favus, extensive case of, 430
Fenger, elephantiasis of scrotum, 352
Fetor of lochial discharges, 97
Fibroid uterus, torsion of, 324
Fibroma of ovary, 435
Fibro-myomata, influence of the climacteric upon, 438
Fibrous tumors of preëpiglottic region, 667
Finlay, inoculations for yellow fever by means of contaminated mosquitoes, 264, 627
Frank, a remarkable case of skin disease, 164

GALL-STONES, suppurating hydatid of liver simulating, 652
Gases, influence of disease upon the respiratory interchange of, 542
Gastrostomy, technique of, 657
Genitals, vegetations on, 80
Gerster, aseptic and antiseptic details in operative surgery, 495
Glottis in singing, action of, 669
Gold Coast, malaria on, 535
Gonorrhœa in the female, 320
Gonorrhœa of mucous membrane of mouth in newborn, 675
Gonorrhœal infection in mouths of newborn, 210
Goodhart, rest and food in treatment of anæmia and anorexia nervosa, 238
Graves's disease, crises of digestive tract in, 651

Graves's disease, electro-therapeutics of, 299
Gumma of the conjunctiva, 550

HÆMATO-SALPINX, etiology of, 318
Hæmorrhoids, 186
Hæmorrhoids, ointment for, 77
Hair, superfluous, removal of, 404
Harris, possible results of Cæsarean delivery, 371
Hay fever, menthol in, 405
Heart, death from rupture of varices of, 188
Hemorrhage, cerebral, convulsions as a cause of, 541
Hemorrhage from membranes during labor, 98
Hemorrhage into the labyrinth, 202
Hernia, operation for non-strangulated, 546
Hernia, radical cure of, 193
Herman, pregnancy with Bright's disease, 485
Herpes of cornea from influenza, 549
Herpes zoster, traumatic, 203
Hip disease, traction treatment of, 544
Hydatid disease, treatment of, by incision, 92
Hyde, study of pre-Columbian syphilis in America, 117
Hydrochlorate of phenocoll, 79
Hysteria in a child after influenza, 652

ICHTHYOL in treatment of diseases of women, 321
Infancy, early, epileptiform convulsions in, 107
Infant mortality, 674
Influence of pregnancy upon respiratory metabolism, 212
Influenza, epidemic of 1889-90, 298
Internal disinfection, labors without, 98
Intestinal anastomosis by means of vegetable plates, 305
Intestinal catarrh, treatment of, 326
Intestinal obstruction, localized meteorism in, 554
Intra-thoracic surgery, 565
Intussusception, treatment of, 296
Iodides in scrofulous children, 325
Iodism, 646
Iodoform and aristol, 81

JACKSONIAN epilepsy, 587
Jarman, aseptic and antiseptic gynecological surgery, 169

KEEN, cerebral surgery, 219
Keen, Jacksonian epilepsy, 587
Keloid and hypertrophic cicatrix, scarification in, 204
Koplik, etiology of empyema in children, 40, 151
Kidneys, diseases of, 329
Klotz, case of pemphigus foliaceus, 620

LABOR, induced, 98
Labor, surgical treatment of, 671
Labyrinth, hemorrhages into, 423
Lamnectomy, 25
Laparotomy, after-treatment of, 437
Laparotomy for contusion of abdomen, 660
Laryngeal muscles, double innervation of, 668
Laryngectomy, 668
Larynx and trachea, fractures of, 207
Larynx, anomaly of, 666
Larynx, extirpation of, 94
Larynx, foreign bodies in, 426
Larynx, fracture of, 427, 667
Larynx, morbid growths of, 424, 667
Larynx, œdema of, 670
Larynx, paralysis of, 670
Larynx, syphilis of, 667
Larynx, wounds of, 427
Lavage, 645
Lepra at Hanoi, 205
Leprosy, treatment of, by nerve-stretching, 19
Leukæmia and pregnancy, 676
Light-sense, Weber's law in testing, 311
Liver, laparotomy for wounds of, 545
Lloyd, lamnectomy, 25
Lovett, diagnosis of Pott's disease, 612
Lupus, potassium cantharidate in, 539

MALFORMATION of the heart, 189
Malta (remittent) fever, 293
Maternal impression followed by production of a monster, 434
Membrana tympani, use of collodion in relaxation of, 422
Ménière's vertigo, 422
Mental diseases, sulphonal in, 531
Mental symptoms after surgical operations, 660
Methyl-blue, 645
Methyl-bromide, 643
Methylene, death under, 529
Milk and its contamination, 674
Mills, Jacksonian epilepsy, 587
Mirror, a new form of, 666

Mitra, treatment of leprosy by nerve-stretching, 19
Monster, a parasitic, 552
Morphine *vice* codeine and narceine, 643
Morvan's disease, 302
Mosquito inoculations, 627
Mother's milk, results of examination of, 210
Muscle responses, 361
Myoma, removal of large, 673

NAPHTHALINE as a vermifuge, 403
Nasal mucous membrane, changes in, 199
Naso-pharyngral and middle-ear disease, relief of, 423
Nephritis, partial, 302
Newborn infants, inhalation of oxygen in, 316
Nitrogen monoxide and oxygen for anæsthesia in minor surgical operations, 131

OBSTETRIC demonstrations, manual of, 674
Obstetric practice, results of hospital and private, 209
Obstruction and insufficiency at the tricuspid, mitral, and aortic orifices, 189
Occipito-posterior rotations, 314
Œsophagus, congenital occlusion of, 302
Ointments in diseases of the skin, 399
Operations, curative effect of, 413
Ophthalmia, sympathetic, 547
Ophthalmic surgery, platinum instruments in, 549
Ophthalmoplegia, pathology of, 512
Osteomalacia in insane patients, 409
Osteomalacia, treatment of, by castration, 102
Otitis media purulenta in tuberculous subjects, 422
Otitis media, treatment of chronic suppurative, 421
Ovarian abscess, gonococci in, 214, 555
Ovarian cysts, torsion of pedicle in, 100
Ovarian tumors, pseudo-intraligamentous, 554
Ovaries, condition of, in cases of fibro-myoma, 437
Ovariotomy, intestinal obstruction after, 192
Ovary, fibroma of, 435
Oxygen as a distinct remedy for disease, 532

PAPILLOMATOUS ovarian cystoma, 317
Paracentesis abdominis, seat of puncture in, 195
Paracentesis of the theca vertebralis in tubercular meningitis for relief of fluid pressure, 89
Parasitic monster, 552
Pareses of childhood, 600
Park, wound infection, 465
Pathogenic organisms, action of common salt on, 216
Pediculosis pubis, 204
Pelvic disease, relation of heart lesions to, 103
Pelvic suppuration, treatment of, 213
Pemphigus foliaceus, 620
Perineum, protection of, during passage of shoulders, 433
Peritoneum, action of antiseptics upon, 100
Peritonitis, opiates in acute, 184
Piles, surgical treatment of, 543
Piperazin, 80
Placenta, development of, 434
Plastic operation upon ulnar nerve, 306
Pleuritic effusion in children, 559
Pleural effusions, treatment of, 529
Pleurisy, purulent, 655
Pneumonia, fibroid, 294
Pneumonia in infants, epidemic of, 675
Porro operation with invagination of stump, 313, 672
Pott's disease, diagnosis of, 612
Pregnancies, knots in cord in twin, 433
Pregnancy complicated by fibro-cyst of ovarian ligament, 433
Pregnancy, intra- and extra-uterine, 96
Pregnancy, nephritis in, 551
Pregnancy of broad ligament, diagnosis of, 672
Pregnancy, pernicious vomiting and ptyalism of, 97
Pregnancy, retro-peritoneal, 96
Pregnancy with Bright's disease, 485
Pregnant uterus, prolapse of, 210
Premature detachment of normally situated placenta, 97
Prostate, Bottini's method of treating enlarged, 196
Prostate, enlarged, palliative operations in cases of, 95
Pruritus hienalis, clinical study of, 431
Psorospermose folliculaire végétante, 428
Puerperal eclampsia, 314, 550
Puerperal fever, epidemic of, 209
Puerperal infection, rapidly fatal, 209

Puerperal period, emotional element in, 98
Puerperal psychoses, 532
Puerperal sepsis, treatment of suppuration during, 211
Puerperal state, high fever after, 316
Puerperal state, secondary perineorrhaphy during, 316
Pulmonary abscess, 301
Purpura of mouth, pharynx, and larynx, 666
Pyonephrosis, vesical pain as a symptom of, 104

RAILWAY spine, the back in, 247
Rectum, diverticulum of, 317
Relation of weight of placenta to weight of child, 95
Resection of second and third divisions of fith nerve at foramen rotundum and foramen ovale, 661
Retinal and choroidal circulation on nutrition of eye, 309
Retinal vessels, light-streak on, 549
Reviews—
Baelz, Diseases of Respiratory Organs, 639
Bramwell, Atlas of Clinical Medicine, 525
Brown, Koch's remedy in Throat Consumption, 67
Brown, Madeira and the Canary Islands, 181
Carter, Elements of Practical Medicine, 180
Complete Works of Charcot, 398
Execution by Electricty, 285
Fox, Strathpeffer Spa, 181
Gerlach, The Peptones, 520
Gibbes, Practical Pathology and Morbid Histology, 523
Grandin, Electricity in Gynecology, 281
Hamilton, Fractures and Dislocations, 277
Hammond, Diseases of the Nervons Sytem, 176
Hayem, Chemistry of the Stomach, 282
Hayem, Lectures on Therapeutics, 631
Hutchinson, Diseases of the Nose and Throat, 525
Jennings, 'Cycling and Health, 181
Loring, Text-book of Ophthalmoscopy, 395
Martin, Essentials of Surgery, 69
Moullin, Practical Treatise on Surgery, 178
Reviews—
Oliver, Lead Poisoning in its Acute and Chronic Forms, 634
Ott, the Modern Antipyretics, 521
Pepper, Contribution to Study of Malaria, 279
Piffard, Diseases of the Skin, 389
Pritchard, Diseases of the Ear, 637
Purdy, Diabetes, 392
Recent Works on Diagnosis, 70
Reese, Medical Jurisprudence and Toxicology, 521
Regnier, Hypnotism and Ancient Beliefs, 396
Roberts, Digestion and Diet, 638
Robinson, Latin Grammar of Pharmacy of Medicine, 524
Rohé, Text-book of Hygiene, 526
Saundby, Lectures on Diabetes, 522
Smith, Diseases of Infancy and Childhood, 638
Snow, Barbarity of Circumcision, 73
Snow, Proclivity of Women to Cancerous Diseases, 68
Thompson, Influenza, or Epidemic Catarrhal Fever, 66
Vierordt, Medical Diagnosis, 636
Wallian, Medical Pneumatology, 74
Whipple, Clinical Examination of Urine, 181
Woodhead, Bacteria and their Products, 523
Rheumatism, carbolic acid in, 534.
Rheumatoid arthritis, 295
Rodent ulcer, treatment of, 204

SALINE preparations, new use for, 288
Salol, death from, 534
Salol, toxicity of, 403
Salpingo-oöphorectomy, 215
Sandford, a remarkable case of skin disease, 164
Sarcoma, 546
Sarcoma of cervix uteri, 324
Scarlatina, shortening the infective period in, 540
Scrotum, elephantiasis of, 352
Senile chorea, 296
Seventh International Congress of Hygiene and Demography, 678
Skin disease, a remarkable case of, 164
Skin diseases, treatment of, 429
Spasmodic tic of soft palate, 208
Specific gravity of blood, 754
Spinal surgery, 661

Sponges and their use in surgery, 90
Soxhlet's experience with sterilized milk, 210
Stab-wounds of spinal cord, 303
Starr, responses to the alternating galvanic current in normal and degenerate muscles, 361
Stone, removal of, by vaginal cystotomy, 107
Sternberg, Dr. Finlay's mosquito inoculations, 627
Sturges, the kindred of chorea, 578
Suppurative phlegmon of epiglottis, 670
Surgery, intra-thoracic, 565
Surgery, spinal, 661
Syphilis and gastric ulcer, 652
Syphilis in America, study of pre-Columbian, 117
Syphilis, treatment of, 644

TABES dorsalis, affections of ear in, 198, 422
Tetanoid convulsions in an infant, 328
Thiol in skin diseases, 203
Thyroid juice, diuretic action of fresh, 649
Tongue, hemi-atrophy of, 300
Torsion, mechanical causes of, 214
Trachea, anomaly of, 666
Tubal abortion, 316
Tubercle bacilli, alkaloid from, 79
Tubercle bacillus, chemistry and toxicology of, 79
Tubercular meningitis, diagnosis of, 325
Tuberculin, experiences with, 78, 81, 83, 84, 85, 86, 87, 190, 191, 406, 409, 430, 431
Tuberculosis, treatment of, 299, 659
Tuberculosis, treatment of, with Koch's lymph or tuberculin, 1.
Tuberculous peritonitis, surgical treatment of, 322
Tubes, anatomy of, 318
Tumors of the placenta, 212
Turpentine, toxic dose of oil of, 530
Twin pregnancy in a primipara, 315
Tympanic mucous membrane, reduplications of, 201
Tympanum, topography of normal human, 200
Typhoid fever, treatment of, 77, 641

UMBILICAL cord, pyæmia following rupture of, 674
Urea and serous membranes, 269
Uretero-vaginal fistula, 100
Urethra, normal, microörganisms of, 308
Urethra, rupture of, 197
Urethral catarrh, treatment of, 418
Urine, during pregnancy, poisonous properties of, 315
Urine, toxicity of, 654
Urticaria, treatment of, 203
Uterine fibroids, galvanic current in, 434
Uterine fibroids, treatment of, 101
Uterus, amputation of, during labor, 672
Uterus, cancer of, 553
Uterus, curetting the puerperal, 99
Uterus, fibroid, extirpation of, 435
Uterus, perforation of, 432

VAGINA, cancer of, 555
Vagina, foreign body in, 105
Vaginal injections unnecessary in normal labors, 676
Van Arsdale, nitrogen monoxide and oxygen for anæsthesia in minor surgical operations, 131
Varicose veins of leg, ligation of saphena magna for, 93
Ventro-fixation of the uterus, 213
Version, unusual complication of, 211
Vesico-vaginal fistula, etiology of, 214
Vipers, bites of, 647

WELCH, conditions underlying the infection of wounds, 439
Whooping-cough, treatment of, 290, 403, 405
Wilde, pathology of ophthalmoplegia, 512
Willard, extra-thoracic surgery, 565
Williams, normal and pathological histology of the Fallopian tubes, 377
Wound infection, 439, 465
Wounds, dry treatment of, 196

YELLOW fever, inoculations by means of contaminated mosquitoes for, 264
Young, muscle responses, 361

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